

Economic Impact of GMOs

Researched By Nogenics, <https://www.facebook.com/groups/Nogenics/>

GMO Bio-Piracy, Bt & GMO Companion Chemical Pesticides

- 1- According to an 'India Today' Reported
- 2- According to 'The Ecologist' Reported
- 3- Why Bt Technology is an Economical Disaster in the Making
- 4- The Economic Health Impact of Bt Toxicity and GMO Poisonous Companion Pesticides Chemical
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1- According to an 'India Today' Reported:

The government of India has made it very clear that they will not tolerate Monsanto's attempts to commercialize on their indigenous knowledge, a practice known as bio-piracy.

India's National Biodiversity Authority (NBA), a government agency, is suing Monsanto, the world leader in genetically modified (GM) crops and seeds, and their collaborators, the Maharashtra Hybrid Seeds Company, for using local varieties of eggplant to develop a genetically modified version.

Quite simply, the biotech giant did not get prior approval to use the naturally occurring breeds for the purposes of genetic modification, and in so doing violated the country's Biological Diversity Act (BDA), enacted in 2002.

India Stands Up Against Corporate Control of Their Food Supply

India's BDA requires that any entity attempting to use a native plant for commercial or research purposes must first get approval from the NBA; the Act is in force specifically to protect the nation's biodiversity.

Monsanto, however, neglected to do this opting instead to essentially steal the native plants in order to modify them for their own commercial gain. In their own words:

"American seed giant Monsanto and its Indian collaborator, Maharashtra Hybrid Seeds Company (Mahyco) are to be prosecuted for allegedly 'stealing' indigenous plant material for developing genetically modified brinjal variety known as Bt brinjal.

The National Biodiversity Authority (NBA), a statutory body set up under the Biological Diversity Act, 2002, has decided to initiate legal proceedings against the two companies and their collaborators for using indigenous brinjal germplasm without necessary permission. Taking plant material without any permission and using it for commercial purposes is considered an act of bio-piracy."

The Environment Support Group, which filed the initial complaint against Monsanto with the NBA, stated that Monsanto and their collaborators used six local varieties of brinjal [eggplant] for the development of Bt brinjal. Monsanto has fired back, stating they are not to blame for the development of GM eggplant, other than supplying their Cry1Ac gene, a type of Bt toxin. The Indian media called this a "half truth," noting:

"When contacted Monsanto tried to distance itself from the case by saying that it had not developed Bt brinjal, but it had been 'developed by Mahyco, with the Cry1Ac gene accessed from Monsanto, in collaboration with multiple public sector institutions'. This is a halftruth because Monsanto owns 26 percent of Mahyco, and also has a separate joint venture Mahyco Monsanto Biotech Limited which handles its business related to Bt."

Finally, A Country Stands Up to Monsanto for its Indigenous Rights.

The case marks the first time a government has accused Monsanto of biopiracy, and the results could set an important precedent for the future of the food supply. In essence, will we continue to allow corporations like Monsanto to steal, profit from, and patent native plants without compensating the native country from which it came?

2- According to 'The Ecologist' Reported:

"The issue of granting intellectual property rights (IPRs) to life forms—such as seeds, plants, or animals—is a contentious one worldwide. Critics say it's impossible to define when the creation of such a thing took place, and that granting patent rights for a crop such as brinjal negates generations of farmers who, using conventional plant breeding techniques, have managed to develop successful cultivars."

Monsanto has long been trying to establish control over the seeds of the plants that produce food for the world, with little regard for farmers' rights or even basic levels of morality. They have already patented a number of genetically altered food crops, which can only be grown with proper license and the seeds for which farmers must purchase anew each year or face legal prosecution. They have even developed terminator technology—which they hope to deploy soon.

These are seeds that have been genetically modified to "self-destruct." In other words, the seeds (and the forthcoming crops) are sterile, which means farmers must buy them again each year.

The implications that terminator seeds could have on the world's food supply are disastrous: the traits from genetically engineered crops can get passed on to other crops. Once the terminator seeds are released into a region, the trait of seed sterility could be passed to other non-genetically-engineered crops, making most or all of the seeds in the region sterile. If allowed to continue, every farmer in the world could come to rely on Monsanto for their seed supply!

It is estimated that over 30% in royalties need to be paid by bio-pirates like Nestle and Monsanto, DuPont, Dow Chemica, Syngenta, Roch, Eli Lilly, Palmolive, Unilever, Proctor and Gamble Merk and hundreds more for illegally pirating their native indigenous wildlife genes and molecules and using them into conventional and Genetically modified products such as cold resistant, drought resistant, heat resistant, Bt resistant and herbicide ready plants

The top 10 gene modifiers owe over **\$50 billion in annual royalties** on their poisonous GMO varieties that they market and sell back the same 3rd world nations that they have pirated the genes from

3- Why Bt Technology is an Economical Disaster in the Making:

There's more reason than biopiracy to thwart the development of Bt eggplant, and that has to do with the technology itself. Some GM crops, such as GM sugar beets and certain varieties of GM corn and soy, are engineered to withstand otherwise lethal doses of Monsanto's herbicide Roundup. Other GM crops, such as Bt eggplant, are designed to produce their own pesticide internally.

In 2011, Cry1Ab, a type of Bt toxin from GM crops, has for the first time been detected in human and fetal blood samples. It appears the toxin is quite prevalent, as upon testing 69 pregnant and non-pregnant women who were eating a typical Canadian diet (which included foods such as GM soy, corn and potatoes), researchers found Bt toxin in: 93 percent of blood of pregnant women, 80 percent of fetal blood, 69 percent of non-pregnant women blood. The adverse economical impact of GMO Bt technology and other technologies on human healthcare and animal veterinary care can be conservatively estimated to be as follows:

Considering that the average healthcare spending of the globe as part of its GDP is about 12% of all expenditures public and private. <http://www.guardian.co.uk/news/datablog/2012/jun/30/healthcare-spending-world-country> since the global GDP is about 70 Trillion per year 12% makes the total healthcare spending at about 8.4 Trillion dollar.

Now consider that more than 30% of all disease are GMO derived and 75% of all disease list GMOs as a contending adjuvant. It is almost impossible to scientifically pinpoint the GMO health cost and it sure comes close to 3 Trillion or equal to the GDP of France and Italy combined. How did we get those figures?

4- The Economic Health Impact of Bt Toxicity and GMO Poisonous Companion Pesticides Chemical:

Glyphosate and 2-4-D are phosphates Phosphates are antagonists to sulfur. So, for whatever sulfur is left in the soil, and there's not a helluva lot left, it will be wiped out. So how is sulfur antagonists relevant to the health cost? Dr. Stephanie Seneff, in her research on sulfur, found that the absence of sulfur in one's diet contributes to obesity, cancer, depression, ADHD, autism, Alzheimer's and Parkinson's disease, ALS (Lou Gehrig's disease), inflammatory bowel syndrome, multiple sclerosis, infertility, developmental malformations, and cachexia, which is characterized by loss of weight, muscle atrophy, fatigue, weakness, loss of appetite, and complete deterioration of one's system, endocrinal malfunction. The economical cost of those conditions and diseases account for about 50% of all medical costs public and private.

<http://articles.mercola.com/sites/articles/archive/2011/09/17/stephanie-seneff-on-sulfur.aspx>

Besides being sulfur chelators like Glyphosate and 24D, as well as others non-chelators yet carcinogens such as Glyphosine, Glyphosinate, Mesotrion and Dicamba have been shown to be connected to over 180 conditions and diseases. In all there are over 20,000 various chemical used in agriculture today with over 50 chemical compounds specifically targeting a plethora of GMO varieties. Most those chemicals have been proven to be very toxic and at the root cause of a massive lists of diseases. <http://www.beyondpesticides.org/health/pid-database.pdf>

As you may know, chronic inflammation is behind of many increasingly common diseases, such as cancer, diabetes and heart disease. According to Dr. Jeffrey M. Smith: "There's already plenty of evidence that the Bt-toxin produced in GM corn and cotton plants is toxic to humans and mammals triggering immune system responses. The fact that it flows through our blood supply, and that it passes through the placenta into fetuses, may help explain the rise in many disorders in the US since Bt crop varieties were first introduced in 1996. In government-sponsored research in Italy, mice fed Monsanto's Bt corn showed a wide range of immune responses. Their elevated IgE and IgG antibodies, for example, are typically associated with allergies and infections. The mice had an increase in cytokines, which are associated with "allergic and inflammatory responses." Such allergic responses are also caused by gut leaching into the bloodstream from 'leaky gut syndrome' a condition shown to be caused by the accumulation of Bt found in GMO introduced to the body after consumption. 'Leaky gut syndrome' is also a major cause of 'acid reflux disease' and an adjuvant to 'Chrones disease' and 'Celiac Disease'. <http://www.soundhealthinc.com/pdf/gmo.pdf>

5- Conclusion:

For our quantitative analysis we are going to consider America as an example since GMOs started there and a lot more data is available for analysis. Consider that since the introduction of GMOs back in 1996 the GDP of America has been about \$8 Trillion and the healthcare to GDP ratio was 10% or totaling \$800 million. Healthcare dept aside, after the inception of GMOs back in 1996 America has grown sicker and sicker leading to 2013 where the GDP of America reached 16 Trillion dollars out of which a whopping 20% or 3.2 Trillion dollars constituted the total healthcare bill. Even when accounting for inflation multiplying the starting 1996 health care cost 800 million figure by 1.446 the number comes up equivalent to 1.15 Trillion or third of the \$3.2 Trillion a clean \$2.1 Trillion increase in medical costs yearly. This \$2.1 Trillion can be largely attributed to GMO introduction since previous decades in past US history don't show such a dramatic change in medical cost over time for sure never tripling in 17 years. If we only conservatively attribute half of the health care increases to the creation and usage of GMOs and related companion poisons even when the data clearly paints more of a realistic picture showing a deeper adverse economic impacts of GMO, the GMO medical cost on US citizens alone is about \$1 Trillion! Using the same numbers and since US Medical Bills constitute about 25% of roughly the global health bill the global medical bill of GMO on the globe should be \$4 Trillion. Now consider that the global GMO proliferation in total land mass comes close to ¾ of the US GMO cultivated land, **the economic health impact of Bt toxicity and GMO poisonous companion pesticides chemical** comes down to: **\$3 Trillion/YEAR**

<http://youtu.be/Wtw704KDipg> <http://youtu.be/q3d9k23UyQQ>

GMOs Pesticides Economic Impact on poisoning & Death

1- GMOs Companion Pesticides Direct Toxic Poisoning and Death: GMO related Pesticide are some of the most poisonous, teratogenic, mutagenic & carcinogenic out of all other groups of pesticides. As plants & pests are constantly developing resistance to the lethal GMO pesticides more dosages are being applied as well as more

potent combinations of poisons become necessary to maintain the agricultural quota of past harvests. As Pesticide usage increase to a 3 million tons of poisons annually and worldwide, crop loss from pests has remained relatively constant! [A] The World Health Organization estimated in 1996 that 3 million pesticide poisonings occur annually, causing 220,000 deaths & ever since that figure has been on the rise at a catastrophic rate of 10% each year (with few exceptions). [B] Pesticides select for pesticide resistance in the pest population, leading to a condition termed the GMO 'pesticide treadmill' in which pest resistance warrants the development of a new more deadly pesticide.[C] The trade-off between the environment and a need for food is not as portrayed by the industry and the scientific research institutions that they bankroll. In other words we can still feed the world using conventional agriculture without the usage of the deadly GMO technologies,[D] and that pesticides simply replace good agronomic practices such as crop rotation, agro-homeopathy and companion planting.[C]

The Economic impact from the direct death of 1,100,000 human each year and 15,000,000 get poisoned and hospitalized thereafter is very hard to gage. If a human life is estimated in insurance purposes to be worth 10 of his working years and if the average global GDP per Capita of an average world citizen is about \$8,000 as of 2013 and if for every injured person and hospitalized individual you would consider a two months wages in loss revenues and hospitalization costs you can come up to about, 88 Billion of death costs and \$20 billion in hospitalization costs. Therefore the total GMO pesticides economical impact on direct loss of life and hospitalization comes up to: **\$108 Billion/ YEAR**

[A] Pimentel. 1996. "Public health risks associated with pesticides and toxins in foods in Radcliffe's IPM World Textbook". 7 December 2008.

[B] WHO. 1992. Our planet, our health: Report of the WHU commission on health and environment. Geneva: World Health Organization.

[C] Chrispeels, M.J. and D.E. Sadava. 1994. "Strategies for Pest Control" pp.355–383 in Plants, Genes, and Agriculture. Jones and Bartlett, Boston, MA.

[D] Lappe, F.M., J. Collins, and P. Rosset. 1998. "Myth 4: Food vs. Our Environment" pp. 42–57 in World Hunger, Twelve Myths, Grove Press, New York.

GMOs Economic Impact on live stock

Please note that that adverse effect any toxicological substance effecting the environment and animals will also transfer to various degrees those same adverse effects to humans. Recent incidents and scientific findings cast grave doubts over the safety of GM food and feed. We shall be circulating a selection of the following reports:

- 1- **Documented Health Risks of GMOs**
- 2- **Transgenic DNA and Bt Toxin Survive Bovine and Human Digestion**
- 3- **GMO Diets Cause Liver Damage in Rats**
- 4- **GMO Feed, Animals Had Higher Death Rates and Organ Damage.**
- 5- **Reproductive Failure and Infant Mortality in Rats**

6- GMO Trigger Immune Reactions and May Cause Allergies

1- Documented Health Risks of GMOs:

Several animal studies indicate serious health risks associated with GM food," including infertility, immune problems, accelerated aging, insulin regulation, and changes in major organs and the gastrointestinal system. This latest incident in a German farm raises tough questions for our government's scientific advisors who have persisted in ignoring scientific evidence that GM food is far from safe. Dr. Mae-Wan Ho and Sam Burcher call for a public enquiry. <http://www.i-sis.org.uk/CAGMMAD.php>

2- Transgenic DNA and Bt Toxin Survive Bovine and human Digestion:

he very first crop submitted to the FDA's (Food & Drug Administration) voluntary consultation process, the FlavrSavr tomato, showed evidence of toxins. Out of 20 female rats fed the GM tomato, 7 developed stomach lesions [1]. The type of stomach lesions linked to tomatoes could lead to life-endangering hemorrhage, particularly in the elderly who use aspirin to prevent blood clots [2]. Dr. Pusztai believes that the digestive tract, which is the first and largest point of contact with foods, can reveal various reactions to toxins and should be the first target of GM food risk assessment. Mice fed potatoes engineered to produce the Bt-toxin developed abnormal and damaged cells, as well as proliferative cell growth in the lower part of their small intestine [3]. Rats fed potatoes engineered to produce a different type of insecticide (GNA lectin from the snowdrop plant) also showed proliferative cell growth in both stomach and intestinal walls.

[1] Department of Veterinary Medicine, FDA, correspondence June 16, 1993. As quoted in Fred A. Hines, Memo to Dr. Linda Kahl. "Flavr Savr Tomato..... Pathology Branch's Evaluation of Rats with Stomach Lesions From Three Four - Week Oral (Gavage) Toxicity Studies... and an Expert panel's Report," Alliance for Bio- Integrity (June 16, 1993) <http://www.Biointegrity.org/FDAdoes/17/view1.html>

[2] Pusztai A. Genetically Modified Foods: Are They a Risk to Human/Animal Health? Action Bioscience 2001. www.Actionbioscience.org/biotech/pusztai.html

[3] Fares NH, El-Sayed AK. Fine structural changes in the ileum of mice fed on endotoxin treated potatoes and transgenic potatoes. Nat Toxins 1998; 6: 219-33.

3- GMO Diets Cause Liver Damage:

Rats fed the GNA lectin potatoes had smaller and partially atrophied livers [4] Rats fed Monsanto's Mon 863 corn, engineered to produce Bt-toxin, had liver lesions and other indications of toxicity [5]. Rabbits fed GM soy showed altered enzyme production in their livers as well as higher metabolic activity [6]. Rats fed Roundup Ready soybeans also showed structural changes in their liver [7].

[4] Pusztai A. Can science give us tools for recognizing possible health risk of GM? Nutr Health 2002; 16: 73-84.

[5] Tudisco R, Lombardi P, Bovera F, *et al.* Genetically Modified Soya Bean in Rabbit Feeding: Detection of DNA fragments and evaluation of metabolic effects by enzymatic analysis. J Anim Sci 2006; 82: 193-99.

[6] John MB. 13-week Dietary Subchronic Comparison study with Mon 863 Corn in rats Preceded by a 1-week Baseline Food Consumption Determination with PMI Certified Rodent Diet#5002, December 17, 2002.

[7] Irina Ermakova. Experimental Evidence of GMO hazards. Presentation at Scientists for a GM Free Europe, EU Parliament, Brussels, June 12, 2007.

4- GMO Feed, Animals Had Higher Death Rates and Organ Damage:

The cells in the pancreas of mice fed Roundup Ready soy had profound changes and produced significantly less digestive enzymes [8]; in rats fed a GM potato, the pancreas was enlarged [5]. In various analysis of kidneys, GM fed animals showed lesions, toxicity, altered enzymes production or inflammation [6-9]. Enzyme production in the hearts of mice was altered by GM soy, [6] and GM potatoes caused slower growth in the brain of rats [5].

[5] Tudisco R, Lombardi P, Bovera F, *et al.* Genetically Modified Soya Bean in Rabbit Feeding: Detection of DNA fragments and evaluation of metabolic effects by enzymatic analysis. J Anim Sci 2006; 82: 193-99.

[6] John MB. 13-week Dietary Subchronic Comparison study with Mon 863 Corn in rats Preceded by a 1-week Baseline Food Consumption Determination with PMI Certified Rodent Diet#5002, December 17, 2002.

[8] Malatesta M, Biggiogera M, Manuali E, *et al.* Fine structural analyses of pancreatic acinar cells nuclei from mice fed on GM soybean. Eur J Histochem 2003; 47: 385-88.

[9] Vecchio L, Cisterna B, Malatesta M, Martin TE, Biggiogera M. Ultrastructural analysis of tests from mice fed on genetically modified soybean. Eur J Histochem 2004; 48: 449-54.

5- Reproductive Failure and Infant Mortality:

The testicles of both mice and rats fed roundup ready soybeans showed dramatic changes. In rats, the organs were dark blue instead of pink. In mice, young sperm cells were altered [64]. Embryos of GM soy-fed mice also showed temporary changes in their DNA function, compared to those whose parents were fed non-GM soy [12].

[12] Prescott VE, Campbell PM, Moore A, *et al.* Transgenic Expression of Bean α -Amylase Inhibitor in Peas Results in Altered Structure and Immunogenicity. J Agric Food Chem 2005; 53: 176-88.

6- GMO Trigger Immune Reactions and May Cause Allergies:

Allergic reactions occur when the immune system interprets something as foreign, different and offensive and reacts accordingly. All GM foods, by definition have something foreign and different. And several studies show that they provoke reactions. GM potatoes caused the immune system of rats to respond more slowly [60]. And GM peas provoked an inflammatory response in mice, suggesting that it might cause deadly allergic reactions in people [13]. In addition to the herbicide tolerant protein, GM soybeans contain a unique, unexpected protein, which likely came about from the changes incurred during the genetic engineering process. Scientists found that this new protein was able to bind with IgE antibodies, suggesting that it may provoke dangerous allergic reactions.

Organic farmers and others have sprayed crops with solutions containing natural Bt bacteria as a method of insect control. The toxin creates holes in their stomach and kills them. Genetic engineers take the gene that produces the toxin in bacteria and insert it into the DNA of crops so that the plant does the work, not the farmer. The fact that we consume that toxic pesticide in every bite of Bt corn hardly appetizing. Studies verify, however that natural Bt-toxin is not fully destroyed during digestion and does react with mammals. The Bt—toxin produced in GM crops is vastly different from the bacterial (Bt-toxins) used in organic and traditional farming and forestry. The plant produced version is designed to be more toxic than natural varieties [14]. Just like the GM soy protein, the Bt protein in GM corn varieties has a section of its amino acid sequence identical to a known allergen (egg yolk), the protein is too resistant to break down during digestion and heat. If Bt—toxin causes allergies, then gene transfer carries serious ramifications. If Bt genes relocate to human gut bacteria, our intestinal flora may be converted into living pesticide factories, possibly producing Bt-toxin inside of us year after year.

7- Conclusion:

Leading animal experts are now talking about an explosion of pandemic disease in live stock after being fed GMO soy and GMO corn. There still are no exact tracking data on the true Economic cost the GMO levies on the world population of live stock one can only speculate that the economy of scale dictates a cost in the **\$10's of billion annually**

[13] Dutton A, Klein H, Romeis J, Bigler F. Uptake of Bt-toxin by herbivores feeding on transgenic maize and consequences for the predator *Chrysoperia carnea*. Ecol Entomol 2002; 27: 441-7.

[14] Romeis J, Dutton, Bigler F. *Bacillus thuringiensis* toxin (Cry 1 Ab) has no direct on larvae of the green lacewing *Chrysoperla carnea* (stephens) (Neuroptera: Chrysopidae). J Insect Physiol 2004; 50: 175-83.

GMOs Economic Impact on soil minerals and sulfur

"The nation that destroys its soil, destroys itself." --- Franklin Delano Roosevelt

In light of this quote, had Monsanto been around during Roosevelt's time, he would not have taken too kindly to their business strategy. After all, in 2007, 176 million lbs of an extremely toxic herbicide known as glyphosate,¹ first created by Monsanto, was sprayed onto the soil (and everything standing between it) in this country, with untold environmental and human health fallout. Untold, that is, until now...

- 1- Roundup (Glyphosate): The Science Vs. Marketing**
- 2- New Research: Roundup Destroying Beneficial Soil & Food Organisms**
- 3- Conclusion**

1- Roundup (Glyphosate): The Science Vs. Marketing:

2011 was a watershed year, as far as scientific revelations into the nature and extent of the damage associated with Glyphosate-based herbicide usage and exposure is concerned. An accumulating body of peer-reviewed and published research now indicates Glyphosate may be contributing to several dozen adverse health effects in exposed populations. And as we shall see, human exposure is as universal as is the contamination of our food, air, rain and groundwater with this now ubiquitous chemical.

Ever since Monsanto developed, marketed and patented the Glyphosate molecule -- Roundup (®) herbicide's active ingredient -- beginning in the early 70's, a substantial and ever-growing portion of the earth's arable surface has been transformed into an environmental and human health experiment, of unprecedented scale. Non-industry funded human research on Glyphosate exposure is only now being performed, and the preliminary picture being painted isn't very pretty. Recent experimental research found that exceedingly small concentrations of Glyphosate (450-fold lower than used in agricultural applications) induce DNA damage in human cells. Given these findings, it is likely that the widespread adoption of GM agriculture has and will continue to result in massive collateral health damage; the fall-out of which we are only beginning to understand, and yet which we are all no doubt already experiencing, mostly subclinical.

Roundup Ready (®) (Glyphosate resistant) genetically modified (GM) plants (also created by Monsanto) now constitute 70% of all genetically modified food plants on the market today.² This has required the use of increasingly larger quantities of Glyphosate-based herbicides in the regions where these plants are cultivated, making human exposures inevitable, and now simply a question of to what degree. Despite manufacturers' claims, pest resistance to GM crops and commonly used herbicides, are becoming a serious problem, and companies like Dow Agrosiences are seizing the opportunity with newly created GM crops that are 'three herbicide' resistant, requiring the future use of even more toxic combinations and greater quantities of herbicides in America's farmlands, including 2,4 D, a chemical once used in Agent Orange.

Glyphosate is now contaminating groundwater in vast subterranean stretches in areas directly and indirectly exposed to the application of this agrichemical; a finding that runs contrary to manufacturer's claims that Glyphosate is readily "biodegradable" and even "makes the soil cleaner," which it does not. Moreover, one 2011 study found Glyphosate in 60-100% of all US air and rain samples tested, indicating that Glyphosate pollution and exposure is now omnipresent in the regions within which it is applied.

It is one thing to know that when you consume GM food, you are ingesting Glyphosate residues (and secondary chemical metabolites) -- at least, as a consumer you always have a choice (economics permitting) of buying explicitly labeled non-GMO, certified organic food. It is another thing to know that simply engaging in necessary biological functions, such as breathing or consuming water, will result in exposure to albeit minute, and yet nonetheless toxicologically relevant and measurable concentrations of this chemical. Where, then, do we draw the line? Is this a form of chemical assault, or simply collateral damage in the agricultural war against pests?

One thing is for sure: Roundup-ready plants are, through their inherent design, destroying the biodiversity upon which our existence depends. Mono-culturing itself, as the name implies, involves selecting one plant, or a few chosen "ones," out of the tens of thousands that once occupied a pre-agricultural habitat, and renaming all other non-target plants as "other" or "weeds," requiring their destruction. Mono-culturing and genetic engineering have

transformed what were once unimaginably biodiversity and vast habitats, into agrichemical-saturated wastelands, with half-living, chemically-assaulted GM plants just holding on for dear life by a human-held string, until harvest time.

And yet, the more fundamental and unrecoverable problem may be what has happened to the soil itself during this process of GM farming. It takes approximately 1,000 years for the earth to produce (on its own) a 2.5 inch thick layer of fertile soil. And yet, it may take only a single application of Roundup to irreversibly alter the microbial populations within the soil -- much in the same way that a single round of antibiotics may seriously and irreversibly alter your gut flora for the rest of your life.

2- New Research: Roundup Destroying Beneficial Soil & Food Organisms:

New research published in the journal Current Microbiology indicates that Roundup herbicide (®) is having a negative impact on the micro-biodiversity of the soil, including microorganisms of food interest, and specifically those found in raw and fermented foods.

Micro-biodiversity is essential for the global health of our planet. The metabolic activity of microorganisms participate quite literally "at the root" of the nitrogen, phosphate, oxygen and carbon cycles, and are therefore indispensable for the health of the entire biosphere. They are also the most numerous inhabitants in the web of life. There are an estimated 600000000000000000000000000000 (6 x 10 to the 30th power) bacterial cells on the planet, and soil microorganisms represent about 50% of the the total biodiversity in terms of numbers of species. Soil organisms include fungi, and the mycelium which is technically the largest organism in the world, and have a special importance to the health of this planet.

According to mycologist Paul Stamets, the mycelium may in fact be the "Earth's natural internet," a means through which species unrelated in genetic and geographic time and space may communicate with one another, effectively acting like a neural network within the biosphere. These microorganisms (and especially fungi, to which we are more closely related than bacteria) also contain information buried deep within their DNA on the evolution of the tree of life; if destroyed, undiscovered parts of ourselves will no doubt also perish.

This new study found that adverse changes in selected food microorganisms, including death and growth inhibition, were observed at lower concentrations of Roundup exposure than those recommended in agriculture. Researchers also confirmed previous findings that adjuvant or so-called "inactive" ingredients in Roundup formulations were, in some cases, more toxic than the active ingredient itself, namely, Glyphosate.

These findings may explain why certain species of *Lactobacillus bulgaricus*, used in milk production, such as the subspecies *Lactobacillus cremoris*, have been difficult to isolate from the dairy environment in some geographic areas.

It is likely that the use of pesticides, herbicides and biodiversity reduction (plant varieties in pasture) has contributed to the loss and endangerment of a key species used as a food-starter. When microbial biodiversity in the soil is reduced or altered, so too will that of the plants, all the way up the food chain to the grazing animals,

and ultimately the human perched precariously atop the food chain, whose body contains 100 trillion bacteria that come directly or indirectly from the soil.

Glyphosate has been shown in a wide range of other eco-toxicological studies to negatively impact the complex interactions of microbial groups, their biochemical activity and root growth, and subsequently having detrimental effects on plant growth and productivity. Glyphosate also alters microbial populations through changing the pH of the soil, and directly inhibits and/or kills certain soil organisms, while also encouraging the growth of other, potentially less beneficial organisms -- again, not unlike the effect antibiotics have on the human gut flora micro-ecology.

It is instructive to listen to those who have reflected deeply on the nature and significance of soil, in order to understand how the biotech/chemical corporation co-option of our global food production system has comprised the health and wellbeing of all future human and non-human generations:

"Essentially, all life depends upon the soil ... There can be no life without soil and no soil without life; they have evolved together." ~ Charles E. Kellogg, USDA Yearbook of Agriculture, 1939

3- Conclusion:

The mineral chelation and sulfur depletion of soils in all commercial agricultural lands due to the pervasive usage of Glyphosate and herbicide tolerant technologies has unconceivable ecological repercussions including the total depletion of vitamins, amino acids & mineral in planted GMO variety as well as the total purging of essential bacteria and fungus species while genetically altering others through unexpected Horizontal Transfer (HT) of GM genes into the indigenous species from all kingdoms..

The adverse Economical Impact of such loss of the total biological makeup of the biosphere is incalculable and can't even be measured in the **\$100's of trillions to the \$10's of Quadrillions** perhaps (no one knows for sure).

Note that is today's inflation rate of 2013 \$1 quadrillion is equal to the total GDP of earth 13 times over, or 13 years of earth's output. \$10s of Quadrillion is earth total output for hundreds of years. If abandoned completely the biosphere will slowly heal itself without any terraforming help.

"We know more about the movement of celestial bodies than about the soil underfoot."

~ Leonardo DaVinci, circa 1500s.

Further GMO Economic Impacts to be researched are:

GMOs Global Warming Economic Impact

GMOs Economic Impact on Beneficiary insects

GMOs Economic Impact on marine life

GMOs Economic Impact on rivers and streams

GMOs Economic Impact on Monoculture Propagation

GMOs Economic Impact on the Destruction of Habitat

GMOs Economic Impact on aquifers and drinking water