Chapter 17 – Food – The Top Priority

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And Let the Journey Begin!, Down On The Farm, Fertilizers, Is That Really Food?, Better Living With Poisons, Out of Sight Out of Mind, The All-American Diet, Good Eating, Now That's Progress!, References

And Let the Journey Begin!

Now that we know from Table 5 in Chapter 16 that food is our biggest source of carbon emissions in the U.S., let's start with food in our journey to save our planet and the other life that lives here. After all, each and every one of us eats every day, and our daily decisions on what and how to eat can have a huge instantaneous impact. Especially if enough of us do it. And, again, I have already pointed out that good eating habits are not only better for the planet, they're better for us. We'll live longer, have more joy in life, and even spend less money on our food. And pharms.

Best of all, it's a great opportunity to stick it to big corps who have been screwing up our planet for the past century by manipulating the rest of us into buying and consuming things we never even knew we needed. Or wanted. Because we didn't. Until they told us. And we bought it. And we became addicted to poisoning ourselves with their nasty toxic products. While giving them our hard-earned dollars in return to help them become obscenely wealthy, and contribute far more than their share of emissions while living their obscenely wealthy lifestyles. Just saying. Do you like being conned and manipulated? Me neither. This makes me angry. Mightily. For reals. And not just at big corp. Of course they're greedy and unconscionable. Hello? What else is new? Wouldn't that just go with the territory? Actually, now that I know, I'm disappointed with myself for being so gullible and so stupid as to believe their marketing lies for decades. And, I'm embarrassed. I always thought I was smarter than that. However, there's no time like now to change. Better late than never. And the good news is we can do something about this. Now. It's actually one of the fastest things we can turn around. And luckily it's not that hard. The best part is, think how satisfying it will be to see these jerks go down as we stop buying their products! Ahhhhh.

Table 1 - Breakdown of U.S. Food Carbon Emissions, 2020, mmt CO_2e

Category	Non-Combustion Emissions	Electricity	Combustion	Transp. On-Site	Land	Transp. Off Site	Total
Agriculture	556	27	13	41	575	32	1,245
Fertilizers	15	5.6	21	2.1	3.1	1.3	48
Food Processing	3.5	46	59	0.2	0.03	33	142
Pesticides	0.2	0.03	0.4	0.001	0.00003	0.04	0.7
Landfills	39	0	0	0	0.005	1.2	40
Elect. and Nat. Gas Transmission	0.2	0	0	31	0	0	31
Total	614	79	93	74	579	68	1,506

Table 1 shows a more detailed breakdown of our food emissions that was shown at a high level in Table 5 of Chapter 16. Below is a brief overview of each of the pieces of the food emissions, which will be discussed in more detail further on in this chapter.

- **Agriculture** - The biggest piece of our food is indeed what goes on at the farm or ranch or on public lands where we graze livestock. The biggest pieces of agriculture are the non-combustion emissions and the land itself. The biggest part of the non-combustion emissions is the anhydrous ammonia fertilizer, combined with other oxidizable fertilizers that release CO_2 after they are applied to the land. These are also the fertilizers that are over-applied and eventually are washed into waterways, where they are killing our aquatic wildlife by causing toxic algae blooms and dead zones in our fresh water and oceans, as discussed in Chapters 9 and 10. The other huge component of agriculture is the land that we have displaced in order to grow our food and raise our livestock, which not only contributes to our carbon footprint by removing much-needed carbon sinks, but also takes yet more land from wildlife, a huge contributor to driving them to extinction.

- **Fertilizers** themselves have a CO_2 emissions in their production, which is in the second line in Table 1, before they're ever applied to the land. This carbon footprint includes manufacturing of fertilizers and transportation to point of sale as well as within the production facilities. Ammonia, the largest quantity by far, is a petrochemical that is made by combining natural gas with air in the presence of a catalyst. Other fertilizers, such as phosphorous, potassium and other minerals, are mined and refined products that are derived from rocks extracted from the earth.

- **Pesticides** have a relatively low carbon footprint of manufacturing compared to the other line items in Table 1, but are all extremely toxic petrochemicals that are playing a disproportionate role in driving our wildlife to extinction. In the U.S. in 2020, 613,000 tonnes of pesticides were produced in the U.S. and applied to not only agricultural land, but also to municipal gardens and yards. And that was in just one year. Pesticides include herbicides for destroying weeds and other unwanted vegetation, insecticides for controlling a wide variety of insects, fungicides used to prevent the growth of molds and mildew, disinfectants for preventing the spread of bacteria, and compounds used to control mice and rats.[1]

The problem with pesticides is that they typically don't break down very quickly in the environment, and basically linger until they've been consumed or taken up by target organisms and done their job, which is to kill them as quickly as possible. The target organisms can be anything from unsightly weeds to annoying insects, even though the weeds and insects may be beneficial and even absolutely key in the web of life. In this way, we are killing higher life forms like birds, reptiles and mammals by poisoning and killing their food, so that they in turn are either poisoned when they eat, or starved for lack of food. There seems to be some sort of misconception that herbicides aren't as bad as insecticides, because they don't kill insects, just plants. That's a serious bunch of misinformation – if the bugs eat the dead plants they're going to get sick and die, just more slowly and painfully than the plants. I used to joke that if a chemical can kill a plant on contact, it's probably toxic enough to give the rest of us cancer, or at least make us impotent. That would include us humans as well as all wildlife. Now that I'm freaking out over the horrible reality of our situation, I'm not joking anymore, because it's not a joke. It's true.

Table 2 - Food and Agriculture - Carbon Footprint per Capita, mt CO_2e/person-year, (% of Gross**)*

Category	Non-Combustion Emissions	Electricity	Combustion	Transp. On-Site	Land	Transp. Off Site	Total
Agriculture	1.68 (7.6%)	0.08 (0.37%)	0.04 (0.18%)	0.12 (0.56%)	1.73 (7.9%)	0.1 (0.44%)	3.8 (17.1%)
Fertilizers	0.05 (0.2%)	0.02 (0.08%)	0.06 (0.3%)	0.006 (0.03%)	0.009 (0.04%)	0.004 (0.02%)	0.14 (0.8%)
Food Processing	0.01 (0.05%)	0.14 (0.6%)	0.18 (0.8%)	0.0006 (0.003%)	$6x10^{-4}$ (0.0003%)	0.07 (0.3%)	0.40 (1.8%)
Pesticides	0.0007 (0.003%)	0.0001 (0.0003%)	0.001 (0.006%)	$4x10^{-6}$ ($2x10^{-5}$%)	$1x10^{-7}$ ($1.6x10^{-5}$%)	0.0001 (0.0005%)	0.002 (0.01%)
Landfills	0.12 (0.5%)	0	0	0	$1.4x10^{-5}$ ($6.5x10^{-5}$%)	0.004 (0.02%)	0.12 (0.6%)
Elect. and Nat. Gas Transmission	0.0006 (0.003%)	0	0	0	0	0.09 (0.4%)	0.09 (0.4%)
Total	1.85 (8.4%)	0.2 (1.1%)	0.3 (1.3%)	0.2 (1.0%)	1.8 (7.9%)	0.2 (0.8%)	4.51 (20.7%)

**U.S. Population in 2020 was 331.5 million; **Gross Emissions in U.S. in 2020 was 7286 mmt of CO_2e*

Table 2 shows the same information as in Table 1, in slightly more personal units that may be easier for an individual to act on. The first number in each box is the average carbon footprint per capita for each category, and was calculated by simply dividing the total U.S. carbon footprint from Table 1 by the U.S. population. The second number, in parentheses, is the percentage of the total U.S. emissions that the first number represents. The percentage may be easier for some of us to act on, but both numbers are saying the same thing in slightly different ways. For example, the top left box is for non-combustion emissions of Agriculture, which is 1.68 mt/person per year, or 7.6% of our gross carbon emissions in the U.S.. Since non-combustion emissions is from industrial farming practices that use synthetic petrochemical fertilizers that release CO_2 as they oxidize, and from methane released by ungulates (eg cattle), we can, in theory, reduce our carbon footprint by 7.6% simply by consuming only organic foods and avoiding beef and dairy.

Of course, the reality isn't quite that simple, because it's sometimes difficult to find organic food, and many of us will want to consume at least some meat and dairy, so the truth probably lies somewhere in between. Say, if we can switch to half our food being organic and reduce our meat and dairy by half, that's about a 4% reduction in our carbon footprint, or a reduction of 0.84 mt per year, which is a nice move in the right direction, towards our goal of an 80% reduction, or 17.6 mt per year. In this way, we can chip away at our carbon footprint in each category, and each little change will add up to the big changes that we desperately need to save our planet.

For Hilary and I, we're down to pretty much all organic food, and it's fair to say that we eat very little meat and dairy. These days, for us, it's all about the oat milk and vegan cheeses. I haven't eaten beef or buffalo (also an ungulate) more than once a year, if that, for the past 15 years, while Hilary likes beef, but under my pressure, he's managed to (mostly) keep his beef "credit" to once a month. With these habits, I think it's fair to say that our personal carbon footprint in the non-combustion emissions category is reduced by about 80%, which works out to about an 6% reduction in our gross emissions.

Down On The Farm

> "It's a tragic irony that you need to be certified in this country to be organic. You pay money and you have someone check up and make sure that you're nurturing the soil and not adding harmful pesticides and that you're treating animals with dignity. Yet, you can go ahead and ravage the atmosphere, putrefy fresh and salt waters, destroy topsoil, exploit your workers, and poison biodiversity with pesticides, and there's no certification required." Leah Penniman, Farmer, www.soulfirefarm.org

Getting back to the big corp mass production practices that contribute 10% of our CO_2e emissions, one thing that I've never understood is why these farming practices are called "conventional", while sustainable practices that don't use synthetic chemicals are called "organic". Think about that. When you shop for groceries, how do you know if you're buying organic vegetables or not? Well, basically it's the labelling of the products. They'll be labelled with a little sticker (usually plastic, very annoying) that says "organic". The produce that's not organic may be labelled as "conventional" or not labelled at all, implying that the default is "industrial production, with toxic chemicals", which, these days, is true. At least here in the U.S.. And in much of the world. In fact, the default for farming practices globally up until the past century was chemical-free, because we didn't start using synthetic petrochemicals to grow our food in a big way until the first half of the 20th century. This means that before that, the default method of growing food was actually organic. Then big corp convinced farmers that spewing poison all over the land was so much easier, and here we are. In just three generations we honestly believe that poisoning the land equates to conventional agricultural practices. And organic practices are for hippies.

Figure 1 is a more detailed breakdown of the non-combustion emissions.[2] The largest component in this category is agricultural soil management, which includes mainly synthetic nitrogen fertilizers, some emissions from manure and biosolids, direct deposition by livestock, irrigation, drainage and tilling practices. All of these release some combination of CO_2, methane and nitrous oxide when they are land applied. The manure and biosolids release less greenhouse gas because they break down more slowly than the synthetic nitrogen fertilizers. The next largest category is enteric fermentation, which is 96% meat and dairy cattle, but includes smaller amounts from other livestock. The other significant part of non-combustion emissions is manure management from confined livestock operations, which refers to wet manure stored in tanks, pits and lagoons, where it decomposes anaerobically and releases methane, which is many times more potent than CO_2.

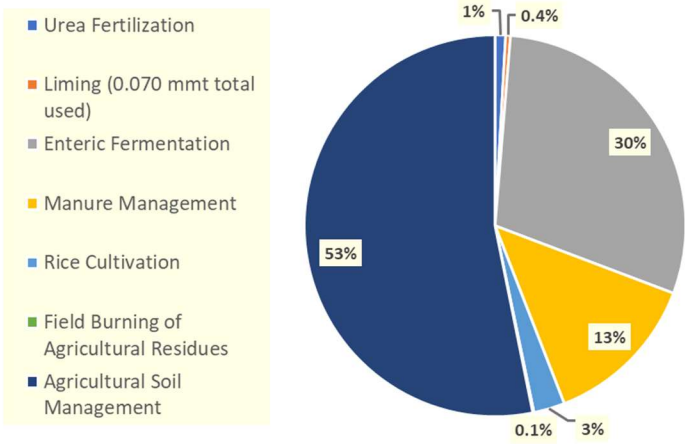

Figure 1 - Breakdown of U.S. Food Non-Combustion Emissions - 2020

Regenerative agriculture is a new way of farming (at least in this day and age, it's actually ancient) that goes beyond organic.[3,4] In addition to applying compost and manure instead of

synthetic fertilizer, it embraces the concept of no tilling, which keeps the tiny microbes and insects that break down nutrients, as well as the nutrients themselves, within the soil, where the crops can take them up through their roots. Both organic and regenerative practices include planting winter cover crops, which not only feed the soil, but literally double the carbon sequestration of a given amount of land. The soil structure stays intact, and its ability to hold on to water and carbon is improved, reducing erosion and runoff, slowing evaporation and fostering soil biodiversity.

Where's the Carbon?

Carbon Storage on Earth, in billions of metric tonnes:[4]

- Oceans: 40,000
- Fossil Fuels: 4,000
- Soil Organic Matter: 1,500
- Atmosphere: 800
- Plants: 600

When land is tilled, not only does it grind up the beneficial organisms in soil at the bottom of the food chain, it also increases the metabolism of any survivors, so that they consume oxygen faster and release CO_2 faster in the process. One of the best things we can do to promote carbon sequestration in our soil is to avoid tilling. Regenerative growing also addresses the entire ecosystem, and not just a few crops, by ensuring plenty of native plants in the vicinity, often surrounding the crops, to create homes for local wildlife, the little critters like insects, pollinators, birds, and small mammals. By allowing a natural balance between predators and prey, the need for pesticides is eliminated.

"A nation that destroys its soil destroys itself". Franklin D. Roosevelt, 1937

Humans don't have to be a blight on this earth. But right now agriculture is responsible for around one-third of the greenhouse gas emissions, 70% of freshwater withdrawals, half the land use, and 78% of the eutrophication (nutrient runoff that causes overgrowth of algae and dead zones in water bodies). If all food were grown regeneratively, the current land emissions would be turned into absorption of CO_2. That's a lot. It would mean taking all the CO_2e emissions from toxic agricultural practices on 1.3 billion acres in the U.S. alone, and converting those emissions into sequestration. Think about that. That would help a lot. Do you think it might be worth saying no to toxic big ag and yes to organic regenerative ag, even if it costs more? I do. When it gets down to it, this feels like a "pay me now or pay me later" kind of thing.

"For more than a century rural America has endured a boom-and-bust economy that has supplied wealthy processors with cheap food, timber, and fuel, but has left the countryside impoverished, and nearly deserted. Rural America hasn't been 'left behind' in the march of progress – it has been systematically gutted." Pamphlet titled "Go Farm, Young People, and Help Heal the Country," by Brian Donahue, historian, educator and farmer.

It turns out that when it comes to cultivation, everything we've been doing is wrong.[4] A lot like raising kids. We've long thought that tilling our soil, and digging in compost and fertilizer and plant matter and such fluffs up the soil and mixes in organic matter. And, it turns out, we'd be wrong. When we till the soil, while it's true that we're mixing in organic matter, we're doing far more harm than good, with an overall net loss of soil carbon, on the order or 50 to 70% of the carbon stores. Ouch! How can that be? The box showing where the carbon is stored on planet Earth reveals that, with all the carbon in the atmosphere that's heating up our planet, the organic carbon that's stored in our soil is twice that

"We can't solve problems by using the same kind of thinking we used when we created them." Albert Einstein

amount. It's also far more than the carbon contained in plants, which is a lot. This means that the last thing we should be doing is tilling our soil, to release yet more carbon into the atmosphere. The good news is that microbes multiply and recover quickly, so if we stopped tilling, the soil would recover pretty quickly. Think about that. There's a lot of potential here to sequester carbon for reals, right beneath our feet. A recent study suggested that mitigating agricultural practices could lower global temperature as much as 25% of the 2°C goal set by the Paris Climate Agreement,[5] which works out to about 0.5 ºC. A pretty good deal if you ask me. Not only is no tilling better for the planet, it's also a lot less work! I speak from experience. I've definitely done my share of tilling.

And, think about this: we might be growing mainly with toxic practices here in the U.S., but globally it's a different story. While almost half of our Earth's habitable land is used for agriculture at this point, scary in itself, and up to 70% is farmed industrially, all that poison and nastiness produces only 20 to 30% of the food. Most of our global food is actually produced by small family farmers using organic, permaculture, agroecological, and traditional mixed farming systems.[6] So, basically, it means that by absolute fact, big corp has convinced us that we need chemicals and big ag, when the opposite is true. I mean, really? I am so sick and tired of finding out that after trying for years to do the right thing, I've been brainwashed by big corp into making things worse. At this point, the best thing we can do here is say NO to big corp's toxic products and their lies. Especially given what an enormous impact getting rid of industrial farming can have on our planet. We absolutely must stop buying this hogwash that we've been getting fed, that we need poisons and mass production to feed the people. Puns intended. We don't. Our food problems have more to do with efficiencies, or lack thereof. It even turns out that corn has a 31% higher yield when grown organically compared to conventional in drought conditions.[7]

Almost all of the alfalfa grown in the U.S., most of the soybeans, and about 40% of corn (three of the four biggest crops by value) go to livestock feed. Irrigating cattle-feed crops consumes 23% of all water consumption, and 55% of the water from the Colorado River goes to cattle feed.[8] It takes 30 LB of grain to produce a LB of beef. In addition to the methane released, which is far more potent than CO_2 as a greenhouse gas, in the U.S., livestock, mainly cows, takes up 41% of the land for grazing and another 20% to grow their feed, a total of 61% of our land.[5] It turns out that hogs are not as bad as cows, because they produce less methane gas. Their digestive systems are much more efficient at converting feed to meat. Also, they eat just about anything, which means they can be fed fresh waste food. So, basically, eat hogs not cows. At home what little meat we eat these days is pork or chicken.

There is obviously a serious opportunity to give land back to wildlife, by saying no to beef. For crying in the night! We can make an instantaneous improvement in wildlife simply by not eating beef. And nasty blood-sucking trolls like Cliven Bundy would go bankrupt. Oh the joy!!
Instead of wasting all this land and energy and CO_2e on cows while shooting predators and destroying wildlife, why not lose the cows that are on public land completely, and when we want some meat go out and shoot an elk or a buffalo? Hello? We could even have professional hunters that love to shoot go out and do that for us, process it and offer it for sale in a local market. Or deliver it to our homes. We could choose between bison, elk, deer and moose, and reduce our carbon footprint by 15% at the same time, while even saving our wildlife. We could give the unsettled portions of the entire western U.S. back to wildlife, which would amount to about half the land, which is what's needed to save our planet. This would be a major win for the planet, all the wildlife and all the humans except for the western ranchers, who would have to find other work, but we've all been there at one time or another. Looking for work, I mean. Personally, I think the planet

and our wildlife are far more important than a handful of ranchers keeping their jobs, but that's just me. Maybe some of them could change track and get into wildlife preserve management. Actually, some already are, as mentioned in Chapter 12. And, it sounds like they're pretty happy.

This isn't a completely crazy idea. At least, not everybody thinks so. A new wilderness bill has been proposed to buy up federal grazing leases from ranchers, putting them out of production, and returning them to wilderness. Of course, ranchers are opposed. Like anybody else, they are used to their lives and resist change, even if it trashes the world for everybody else. It's a sign that we may be finally getting a clue and stopping what was basically a land use experiment in the 1800's (back when there were only 1 billion people on the earth) that is obviously failed and out of date. Time to catch up with the times, ranchers.

The California Air Resources Board (ARB) has set a goal of slashing methane emissions by 40% by 2030, from 2013 levels, and has targeted the enteric fermentation of California's 5.5 million beef and dairy cows, as well as the manure they create. The state's dairy industry is launching a social media and email campaign to fight back, and the Milk Producers Council is lobbying to save the future of the California dairy industry. I hope they lose.

In the U.S., beef production requires, on average, 10 to 50 times as much land, irrigation and fertilizer as poultry or pork, and emits more than 10 times as much CO_2e.[9] And, as if all this isn't bad enough, the animal agriculture industry is overusing antibiotics on livestock, particularly in feedlots. In 2015, the World Health Organization called antimicrobial resistance "an increasingly serious threat to global public health that requires action across all government sectors and society." That was more than 10 years ago, and they're still doing it. 80% of all antibiotics in the U.S. are used in animal agriculture, and most of this is unnecessary. Because of this, antibiotic resistance in humans is increasing, which means that antibiotics that have normally been used to combat infections no longer work.[10]

Grazing livestock has ruined the land and the water in the western U.S. Livestock is responsible for the largest single human use, degradation, and pollution of public watersheds in the West. 95% of all stream dewatering on public lands is caused by stockmen who divert the natural flow to water their cattle or grow hay. A single cattle feedlot in Idaho produces as much untreated sewage every day as the entire city of Denver. The difference being, obviously, that Denver actually treats their sewage. It's no surprise that just about every stream on public lands polluted by livestock is full of E. coli bacteria during the grazing season.[11] Think about that. Think about the fish and wildlife that depends on that water for survival. It's no wonder that we don't have much left.

And for what? These catastrophic environmental costs of running cattle on western public land brings almost no benefit in terms of food, jobs and tax revenue. Less than 2% of U.S. beef comes from Western public lands; most U.S. beef is from the Midwest and East, on private land where there's plenty of rain and it's easy to raise cows. Grazing cows on public land in the West provides only 0.04% of taxable income in the West, and only 0.07% of jobs, according to the Department of the Interior. In the Western states, the livestock industry accounts for less than 0.5% of all income. There are roughly twenty-two thousand permittees running cows on BLM and Forest Service land. The common claim of these grazers is that they "feed the world." Except this claim doesn't match the actual numbers.[11] By a long shot. At the end of the day, if western public lands only provide 2% of our beef anyway, who needs them?

What's even more absurd, we are paying for all this destruction with our tax dollars, whether we consume the meat or not. The subsidy for public grazing fees costs the BLM alone at least $120 million a year. As of 2019, an AUM (Animal Unit Month) on private land averages $21.00, while on Federal land it's $1.41, or about 93% lower than market. From both state and federal agencies public lands ranchers receive additional dollars, totaling hundreds of millions of dollars annually, for fence construction, road building and maintenance, cattle guards, forage improvement and seeding programs, poisoning of unwanted vegetation, forest clearing, water projects such as dams, stream diversions, pipelines, aqueducts, stock ponds and troughs, the monitoring of livestock health, and the control of predators and other mammalian and avian pests deemed a threat to the industry. In other words, the wildlife that was already there when the ranchers invaded.[11]

> "Western cattlemen are nothing more than welfare parasites," Edward Abbey
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> "An inner-city mother on public assistance is the soul of self-reliance compared to a westerner who receives federally subsidized range privileges." George Will, The Washington Post

In Alaska, they're already eating wild meat, including road kill, to the tune of 600 – 800 moose per year that are killed by cars. While it's horrible to be running over moose, at least they're not going to waste, since that amounts to about 250,000 pounds of organic, free-range meat. Up there, it's considered embarrassing to waste meat, as it should be, and they have a system where state troopers who respond to collisions with wildlife keep a list of charities and families who have agreed to drive to the scene of an accident and haul away and butcher the remains. In the past few years, some additional northwestern states are beginning to follow that logic, which certainly makes sense to me![12] It feels like a step in the right direction, losing the stigma against not only eating roadkill, but in wild meat, rather than the cows we've grown accustomed to, thanks to big corp. Now we're used to getting our meat in little Styrofoam boats, swathed in plastic film.

On a more positive note, chefs around the world are using local invasives for ingredients to create awesome and unique dishes. From lionfish to kudzu, invasive species can also be delicious. Lionfish are invasive and aggressive, with no local predators, converted by chefs into a tempura-fried, caramel-glazed, beautifully-plated specimen. Finally, a fish we can eat that actually helps the environment. Until we start running out of those, too. Wild boar, nutria and invasive crayfish are other examples.[13] A local grocery store, Nude Foods, stocks wild boar from Texas, and it's delicious! Hell, even invasive squirrels and rabbits. Why not? Now, if we can just figure out how to enjoy bindweed in a beneficial way.

Fertilizers

There are two basic classes of fertilizers, synthetic and compost:

- **Synthetic Fertilizer** is a $140 billion dollar industry in the U.S. Synthetic fertilizers are made mainly from fossil fuels and minerals that are extracted from the earth, and then refined and processed into a convenient form, a solid salt or liquid, typically, that makes it easy to apply to crop land. Once applied to the land, synthetic fertilizers break down and dissolve quickly, releasing CO_2 into the atmosphere in the process. Therefore, the carbon footprint of synthetic fertilizer includes the CO_2e released from the industrial processes to mine and refine the extracted raw materials that use fossil fuels for energy and release CO_2

from industrial chemical reactions, but also the CO_2 released as the products break down after they are applied to the land. In Table 2, the carbon footprint of manufacturing is just under 1% of the total carbon footprint in the U.S., and the agricultural emissions after they are field applied is about 4% of our total carbon footprint, or about 40% of the total carbon footprint of non-combustion emissions shown in Figure 1, specifically about 80% of the agricultural soil management piece of the pie. All-in, synthetic fertilizers make up about 5% of our total carbon footprint. Therefore, if we choose to consume produce that is grown by organic and regenerative farming practices, which don't use synthetic fertilizers, we can reduce our carbon footprint by 5%.

- **Compost** is a natural fertilizer made from allowing natural microbes to break down waste plant and animal excrement, including from livestock, humans and zoo animals. Any organic matter, even paper, cardboard and wood, can be composted. Even petroleum oil can be composted, because when it's first produced, it's simply fully biodegraded organic matter, mainly ancient microbes. Of course, we tend to convert the petroleum oil via industrial manufacturing processes into nasty synthetics that are toxic and non-biodegradable, but that's another story.

Back to compost, it has the potential to create a completely circular economy, as pointed out in Chapter 14, in which the food we grow and eat and waste is converted into a completely natural compost fertilizer that can be added directly back to the soil, with a complete mix of nutrients required for life. Compost is normally collected and processed a short distance from the point of use, in some cases right on the farm, minimizing carbon footprint of transportation. Of course, compost isn't completely free of carbon footprint, because the aerobic microbes that break down the raw waste materials into the finished compost are animals that breathe in air and exhale CO_2, just like all animals. However, this makes up perhaps 1% of our total carbon footprint, partly because the composting process is much slower than the release from synthetic fertilizers, and a lot of the released CO_2, once land-applied, is taken up by the plants rather than being released to the atmosphere, particularly with no-till regenerative agricultural practices. Compost is currently applied to about 50% of crop land in the U.S., so there's plenty of precedent and a lot of opportunity to do more here.

Synthetic fertilizers provide limited nutrients and don't build the soil because they lack the important natural carbon microbes and fibers required. They contain only specific elements that come from the mined material, such as nitrogen, phosphorus, potassium, calcium and magnesium. Compost, on the other hand, contains pretty much all the nutrients needed for life, including all the complex micronutrients that can't be duplicated in man-made fertilizers. There's absolutely no way to name them all because the list is so extensive that we don't even know them all. Yes, the aerobic microbes that decompose the waste into final compost breathe in oxygen and release CO_2 as they metabolize, a reality that can't be avoided. But the natural, circular process of composting is far better for the planet than synthetics that are extracted from finite deposits within our earth. And far better than dumping the same organic waste into a landfill, where it degrades anaerobically, releasing potent methane instead of CO_2.

Since 1950, the vitamin and mineral content of our food has dropped considerably. In the U.S., it's fallen by 85%.[6] Now, why would that be? Well, think about it. It's reasonable to expect the plants that we grow to contain some mix of the nutrients they have available to them. This implies that if we apply specific nutrients in the form of synthetic fertilizers, then those are the only

nutrients that will be in the final food products. On the other hand, if plants have a full array of nutrients that come from compost, then the food from those plants should, in theory, have a complete array of nutrients. I say, "in theory", because at this point we're in a position that, if our food doesn't contain a full array of micronutrients because we've been eating so much "synthetically produced" food, then the compost may not necessarily contain a complete array of nutrients either. A bit of a vicious circle. However, you can see that we've gotten ourselves into a fix with our industrial growing practices, and the sooner we get out of it, the better.

We can save our planet and ourselves by eating organically produced food that's grown with compost, and avoiding mass produced food that's grown industrially with synthetic toxic chemicals. This is important, because not only do we reduce our carbon footprint by at least 4%, we'll be healthier, since our immune systems are compromised by poor nutrition. Organically grown plants are, like us, more resilient and more resistant to disease, because they have better functioning immune systems. Weak-tit big ag plants, by contrast, may be physically bigger, but they lack nutrients and are far more susceptible to disease outbreaks, and even insect infestations. It's no wonder mass production farmers feel the need to constantly spray their crops with poisons to ward off insects, since the synthetic plants can't really fight for themselves. They're just not strong enough.

It turns out, unbelievably, that homeowners apply about the same amount of fertilizer as is used in agriculture,[14] and about half of this ends up in surface and groundwater,[15] where it kills aquatic organisms and contaminates drinking water sources. So, to completely get rid of the carbon footprint of fertilizers, we have to stop applying them to our personal spaces as well, which will also help a lot with fish and wildlife populations that are being destroyed by contaminated waterways. We also won't be poisoning our kids, pets and ourselves.

Is That Really Food?

Unprocessed food is basically food that may or may not be chopped up or cooked. While there are many levels of food processing, from very basic to extremely highly processed, I've divided food processing into three basic categories. With each increasing level, food is less like the original source, until at the highest levels it's so completely different from the original source that you don't recognize it any more.

- **Minor** food processing, like cooking, canning, drying and freezing are things that are easily done at home, and you can recognize the food, for the most part. Things like soups, pickled products, jams, juices and sauces, like tomato sauce or hot sauce, may be arguably less easy to recognize, more on the edge, but I put those in this category as well, because they're simple to make at home. Also, the original food is still pretty much intact, perhaps a little squashed, but not chemically altered, and no significant parts are removed, though there may be some enzymes that are transformed through cooking.

- At the **second level**, the food starts to look less like the original food, and, since big corp does most of the processing, additives and chemicals to enhance the products in various ways begin to creep in. Big corp just loves to throw a little red dye 40 in the strawberry flavored milk or maraschino cherries to make it more appealing visually, or proprietary artificial flavors to enhance the flavor, so more people buy it than the competitor's

products. Most of this level of processing can be done at home, but usually isn't, because of time requirements. These products normally contain salt and sugar for flavor enhancement, as well. Examples are things like potato chips and other snacks, flours, breads, cakes, cookies, ketchup, peanut butter, dips and sauces. I even put beer and wine making, which involves kilning barley, and extracting from grains and fruits, then fermenting, in this category. Flours and the products made from them are at the highest level of this category, because they're processed through physical means that have been done for centuries, where husks and other parts are removed, and the grain is kilned and ground for use, and after these processes are complete, the flour isn't really recognized as grain, but modifications are limited to the impacts of grinding, heating and removing parts, so the chemistry of the food isn't significantly altered.

- In the **highest level** of food processing, ultra-processed food, the chemistry of the food is altered significantly, usually to extract specific nutrients. These are then recombined into products that are completely unrecognizable from the original food they were made from, with most of the nutrients stripped out of them. These products are unbalanced nutritionally, and, for the most part, are dangerous to consume in significant quantities. Examples are sugar, vitamins and supplements, protein powder, pop, gummy bears, soft drinks, Jello and pharmaceuticals. When we down this garbage, we throw our bodies out of balance with respect to nutrients, and then we may try to get it back in balance by taking, you guessed it, vitamins and supplements, to ward off disease from the imbalance. These are products that couldn't be made at home, because they require sophisticated chemical processes that weren't invented until the 20th century, for the most part, as big corp started to figure out what kinds of cheap food-like substance would appeal to the public, and how to get us addicted to it so they could profit as long as possible, before it kills us. I sometimes wonder if big corp food processers are in cahoots with big pharm, because these ultra-processed food products definitely lead to the "western" diseases like obesity, heart disease, diabetes and cancers, to name a few examples that require big pharm products for relief. If so, it's working; at this point over 58% of calories from food in the U.S. come from ultra-processed foods.[16]

At the end of the day, it's generally best to avoid processed food, and do your own food preparation at home. This way, you can be certain of what you eat, and that there are no nasty petrochemicals or other toxins in there. Doing so can reduce your carbon footprint by a maximum of 2.3%, although arguably if you use energy in the home processing, like cooking or grinding, some

energy is involved for minor processing, so then it's probably more like 2% savings. You can at least reduce your carbon footprint by 1% or more by avoiding the most highly processed foods, in the third category, and be far healthier for it as a result. Around 75% of the sodium we consume in the U.S. is hidden in processed foods, and about 90% of us eat too much sodium, which leads to high blood pressure and other health problems. Higher levels of food processing have a higher carbon footprint. By definition, processed foods typically come in single-use containers, so by avoiding them, we can also cut the carbon footprint of single-use containers, which will be discussed in Chapter 21.

Since sugar is one of the nastiest processed foods consumed by humans, let's have a look at what's going on there. First of all, sugar is usually made from either sugar beets or sugar cane. Table 3 is a comparison of two common raw materials used to make refined sugar, sugar beets and sugar cane. The first number in each box is the percentage of nutrient in the material, and the second number, in parentheses, is the recommended daily allowance, based on a portion size of about a cup, or around 8 oz, and a 2,000 calorie diet. For example, sugar beets contain about 5% fiber, which is about 16% RDA, if you eat a cup of sugar beets. Sugar cane has even more fiber, which is great, because fiber is essential for proper digestion. Note there are also small portions of additional nutrients in a sugar beet, and those listed are just the main ones, as there are also an endless array of micronutrients that are also in beets. It's a similar story for sugar cane. Other than the water, the largest component of these raw materials is the soluble sugar, which makes up 12 – 21% of the actual plant material, but also makes up around 50% of RDA. That means that if you eat two cups of sugar beets, for instance, that's as much as you should eat in a day.

Table 3 - Basic Nutrients in Raw Materials Used to Make Refined Sugar

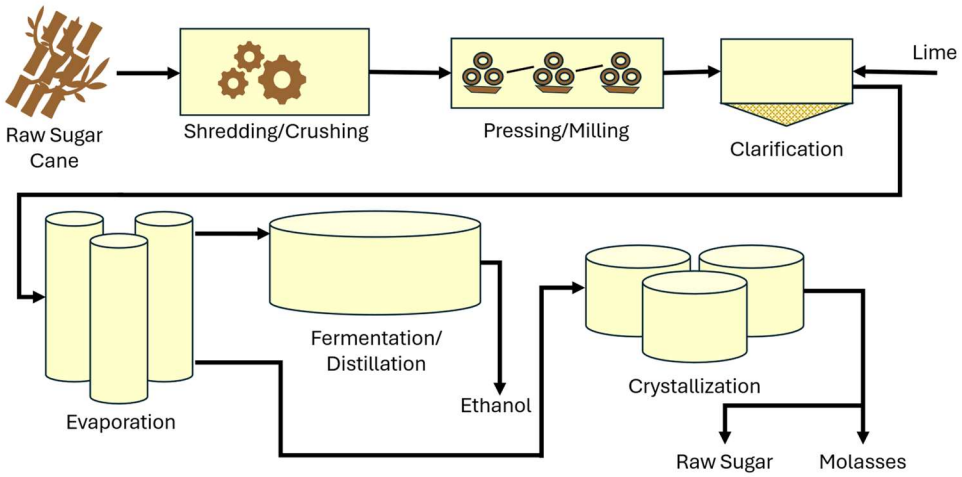
Raw Material	Sugar Beet	Sugar Cane
Fiber	5%, (16% rda)	11 – 16%, (45% rda)
Soluble Sugar	12 – 21%, (55% rda)	12 – 16% (47% rda)
Non-Sugar Carbohydrates (cellulose)	2 - 3%, (8.3% rda)	2 – 3%, (8.3% rda)
Water	75% (15% rda)	62 – 73% (13% rda)
Protein	1%, (3% rda)	0.6%, (2% rda)
Fat	0.15% (0.375% rda)	0.4%, (1% rda)
Calcium	0.011%, (2% rda)	0.011% , (2% rda)
Iron	0.00035%, (4% rda)	0.00035%, (4% rda)
Potassium	0.3% (6% of rda)	0.063%, (3% rda)
Vitamin C	0.3%, (6% rda)	0

RDA (recommended daily allowance) is based on 1 cup (200 g) of material, 2,000 calorie daily consumption

The point of the sugar refining process is to remove all the other matter from the original plant material, including the fiber and the water, to concentrate the sugar. Upon harvesting, the sugar cane, for example, is shredded and crushed to make it easier to extract the sugar, and then it's pressed in a mill to squeeze out the sugar and separate it from the rest of the cane material, resulting in a mix of solid fiber and liquid water with dissolved sugar in it. This mixture is separated into a solid phase and a liquid phase in a clarifier, in which the solids sink to the bottom, leaving the dissolved sugar water. Lime is added to improve the separation, and it ends up in the solids, which may be reused in agriculture. Remember this lime releases CO_2e when it's produced, and also when it's land-applied.

The water phase, which now mainly contains sugar and water, is run through evaporators to boil off the water, leaving the solid sugar behind. The evaporators are heated with steam from a power plant, which may be powered by natural gas or coal. The damp solid sugar is then crystallized to the final raw sugar product by evaporating off the remaining moisture. In the end, 1,000 pounds of sugar cane will yield about 100 pounds of raw sugar. The electricity to power the equipment and the steam to evaporate the water emits CO_2 at the mill, and additional CO_2e is emitted in the mining, refining and land application of the lime. If the raw sugar is to be the final product, then this is the end of the processing, and the sugar is packaged and distributed to consumer outlets, still containing a miniscule level of the original nutrients with the sugar. If the final product is to be white sugar that's completely refined, then the raw sugar moves to another process that refines it completely, stripping it of anything besides pure white sucrose.

Figure 2 – Process Diagram for Raw Sugar



At the refinery, bulk raw sugar is melted using steam, and the steam combined with electricity to power the processing equipment add yet more CO_2 emissions. Additional lime is added to raise the pH, which helps precipitate out the calcium and other impurities. Then the melted sugar is filtered to create thick sugar syrup. Final decolorization involves washing the syrup with water, then concentrating again with centrifuges, using electricity, followed by a final evaporation step to completely dry and crystallize the sugar. Sometimes sulfur is used to bleach the sugar and as a preservative. This additional refining process results in at least twice the carbon emissions, compared with raw sugar.[17]

At the end of the day, the refined sugar is completely different from the original raw plant matter that it was stripped from. This is what I mean by a high level of food processing. A serious amount of energy is consumed, and the stripped-out material, which is actually good for us, is removed, leaving only the white sugar, or sucrose. And the only reason for bothering to do all this is to concentrate the sugar so that big corp can add it to other processed products to sweeten them, or to offset bitterness and differentiate their products from others, while poisoning the general population. For example, one can of Pepsi contains a whopping 39 grams of sugar, or 23% more than the average RDA. Think about that. Just one can of Pepsi will O.D. you on added sugar for a day. And that's for an

average adult on a 2,000 calorie diet. If a little kid or an average sized woman drinks a single can of Pepsi, it's 50% to 100% more, at least.

And the worse thing is that sugar is added to nearly every processed food there is. They can't even make hot sauce without it. Go to the store and read the ingredients. It's absurd. Think about that. Is it really any wonder that diabetes in the U.S. is the highest in the world, impacting more than 10% of our population? When we could just eat organic beets, be far healthier, and reduce a lot of carbon emissions all at the same time?

The story is similar when it comes to flours. Some grain, wheat, oats, barley, rye, etc., which are actually seed heads of grasses, are cut off the top of the plant, and threshed to remove the grain from the rest of the head, leaving the "chaff", or outer coating, behind. For wheat flour, the grain is milled at this point, and for white flour, an additional process train removes the germ and endosperm, which are actually the most nutritious parts of the grain. These byproducts are discarded, fed to livestock or packaged into separate products, like wheat germ, or wheat germ oil. Once the flour is baked into breads and other products, it breaks down in our stomachs into the same soluble sugars that are giving us unbalanced diets devoid of actual nutrients, though some breads may be fortified with processed vitamins in order to give them some rudimentary levels of nutrition. Whole wheat flour at least has some remaining nutrition in it, but it still breaks down into the soluble sugars that are killing us all once it hits our guts.

At the end of the day we should minimize wheat and bread, because they contain gluten and sugar, both of which lead to an endless array of diseases from brain and neurological diseases like autism, ALS, Epilepsy, Parkinsons, migraines, depression and brain fog, cancer, autoimmune disorders including diabetes and rheumatoid arthritis, digestive disorders and heart disease, to name just a few.[18] It turns out that every processed food you can name contains gluten or sugar or both, making a very good case to avoid processed foods altogether. I mean, is that cereal really worth the risk to your health and your brain?

Don't even get me started on the more intensive processes to create the vitamins, supplements, food additives and gummy bears. You get the idea. The more processed a food is, the more stripped down and devoid of nutrients it becomes, and the higher the carbon footprint of production. By just eating fresh produce we can knock more than 2% from our carbon footprint, in addition to the more than 12% we can reduce by eating organic. And be healthier for it.

Better Living with Poisons

In the U.S., 613,000 metric tonnes of pesticides are manufactured and applied to our land each year, in a $21.4 billion dollar industry. The general category of pesticides covers pretty much all of the poisons we apply to agricultural land and within our homes, gardens and yards, as well as our own skin (think DEET, yes, we're really that stupid), for the purpose of killing or deterring that life that we deem "pests". This includes insecticides intended to directly kill any wildlife that may dare to venture onto cropland and even think about taking a bite out of the crops that we replaced their original food with, including, but not limited to, insects, birds, and caterpillars that would later become butterflies if we didn't poison them first, as well as the butterflies themselves. This category also includes the herbicides intended to kill the pesky weeds, which are often the original native plants that used to live in the fields and lawns before we commandeered them for our crops,

lawns and gardens. While it's true that some of these so-called "weeds" are truly invasive, it's also true that herbicides don't distinguish between "natives" and "invasives". When applied, they kill pretty much everything in their path. Another member of the pesticide family is the fungicides, intended to deal with mold or rot, after we've thrown the entire ecological system so out of balance by killing everything else, that the agricultural plants can't cope through natural defensive mechanisms. So, here we are.

Table 2 shows that the carbon emissions of manufacturing pesticides is fairly small in the big picture. However, as discussed in several previous chapters, their impact on our plants and our wildlife goes far beyond the carbon footprint of manufacturing. It is a huge way that we are killing our wildlife, either directly or indirectly. Pesticides typically don't break down in the environment after they're applied, until they've been "consumed" or reacted as they kill. Pesticides are typically overapplied to make sure they don't leave anything alive on the targeted land, and anything that is left over either remains on the land until it's spent, or runs off onto other land and waterways until it is spent.

The kill zone typically extends far beyond the intended crop, since any wildlife or even humans that enter the kill zone will become contaminated and become sickened after the fact. For example, birds may inadvertently feed on sick or dead insects, sickening themselves in the process, and either dying or failing to reproduce as a result. Think about that. If you were a bird, would you want your kid to eat an insect that barely survived a Monsanto Roundup spray on an Iowa cornfield? Well, that's what we seem to expect the birds to do and it's no wonder they're all dying. Hello? And, it's no wonder that these nasty toxic petrochemicals have spread out into the environment and can be found just about anywhere, even at great distances from the original sprayed crop field, as it is transported via our waterways and wildlife.

Big corps such as Monsanto like to soothe our worries about herbicides like glyphosate, or "Roundup", by stating that it just kills worthless weeds and nothing else. Of course, just like about everything big corp says, this is just another lie to mislead us and keep those big bucks coming. It turns out that glyphosate is actually linked to cancer and other health problems in humans, and has recently been shown to negatively impact the gut biome in honeybees.[3] Harmless? My ass! In Chapter 12 we saw that application of pesticides to lawns is linked to lymphoma and other cancers in young children and pets. Think about that. By knocking it off with home use of pesticides, we can save wildlife while not giving our kids and pets cancer and saving money all at the same time!

And, what's absolutely ludicrous is that the main target of Roundup on flat green lawns is dandelions. You've got to be kidding me. Not only are dandelions more nutritious than most leafy greens purchased in grocery stores, the only reason

I decided that it wasn't ethical for me to spend my dollars with stores that sell pesticides that are killing our wildlife and our planet. That turned out to be harder than I thought. It turns out that every Home Depot, Ace Hardware, and all the local hardware stores find it necessary to sell these poisons. Even the historical end-all McGuckin hardware in Boulder sells this deadly poison. So, now I take the hard, less-travelled road. It takes more effort, but I refuse to give these hypocrites my money when they're complicit in poisoning our planet. I first seek out local specialty stores for plumbing and electricity, and I always check with Habitat for Humanity. As a last result I'll order on-line, but not from Amazon. I do my best, and feel better about myself.

they are spread across all continents besides Antarctica is because humans introduced them because they're so awesome.[19] And now we're killing them with poisons, when we should be eating them. In our own yard, we eat them, and they're great. We're not about to argue with free, nutritious organic food that's right outside our door. Hello?

The Agricultural Health Study, led by the National Institute of Environmental Health Sciences since 1993, has more than 200 research studies into the impacts of pesticides on the health of farmers.[1] Below are just a few of the many ways pesticides are sickening humans. Keep in mind that whatever is happening to humans, it's far worse for wildlife that has to live their entire lives in toxic environments, while we humans can at least go inside and take a damn shower. Also, wildlife doesn't have access to modern medicine, which can mitigate some of the impacts, though not necessarily cure us. Evidence suggests that children are particularly susceptible to adverse effects from exposure to pesticides, including neurodevelopmental effects. I don't know about you, but I find this list horrifying.

- Parkinson's disease.
- Autoimmune diseases
- Kidney diseases, such as impaired kidney function and renal cell carcinoma
- Shingles (herpes zoster)
- Thyroid disease
- Diabetes
- Asthma

In many states, crop spraying is legal, so anyone who happens to be in the way when crops are sprayed get sprayed with the poisons. In Oregon, local counties are trying to get the power to create environmental protections, which they believe are needed to end corporate political dominance and protect their health. Locals are dying early of cancers and other illnesses, and having miscarriages

from the spraying exposure. In addition to direct contact, the poisons are leaching into drinking water supplies. The Oregon Secretary of State is keeping the initiatives for local control off the ballot, citing concerns about the scope, when in reality it's because she gets significant campaign donations from the timber industry. National agrichemical interests have also poured money and resources into fighting the local initiatives.[20] Now how sleezy is that? This goes to show that we can't wait for government to solve our environmental problems. And we have to stop paying slimy lying big corps with our hard-earned dollars by buying their toxic products.

Basically, this is yet another reason to eat organic, ORGANIC, ORGANIC. Every product we buy, we choose either for or against big corp, who fights hard to keep spraying poisons into the environment. Every product we buy is a choice for or against the planet and our wildlife. Buying toxically grown food is one of the most irresponsible things we can do, a vote against this planet and a vote for big corp and their poisons every time.

Even many of the supposedly "organic" pesticides have negative environmental impacts, particularly on the bees that we so desperately need to save. One of many examples is Entrust, manufactured by Dow DuPont, that is toxic to pollinators and other beneficial insects.[3] The use of pesticides generally can be avoided by planting a natural balanced variety of crops and plants, rather than the monocrops of mass-production industrial farms.

Insects have gotten a bad rap that they don't deserve, mainly from big chemical industries who are constantly seeking to profit off people's ignorance, and selling them things they don't even need, and never did. Kind of like bottled water. Only worse. If that's possible. We're so brainwashed that our first reaction to insects is to spray the tar out of them, never mind that those poisons are killing off everything in the vicinity, and probably us too. What we should really be worried about are the poisons that are getting sprayed on our food and the environment, and not the little critters that are at the base of the intricate web of life on our planet. And, at the end of the day, plants can usually handle a little feeding from insects. After all, they did evolve with insects and were in balance with them, until we came along and jacked up the entire ecosystem with poisons. Think about that.

Farmers have even taken to spraying orange trees with streptomycin, a medically important antibiotic, in a desperate attempt to combat citrus greening disease, which is spreading across the U.S. Sadly, it's not a long-term cure, and it's exacerbating antibiotic resistance, especially for those living nearby. By the way, antibiotic resistance was named a "top 10 public health threat facing humanity" in 2020,[21] though you may not have heard about this since big corp mainly dictates what we see on mass media. If you buy oranges or orange juice that's not organic, you are supporting this practice with your dollars.

Out of Sight, Out of Mind

We waste so much food in the U.S. that we can literally cut our carbon footprint of food in half by simply not wasting our food. Luckily, not wasting our food also cuts our food budget in half, so if you have a tendency to whine about the higher, unsubsidized costs of organic food while wasting the poisonous subsidized food that you buy and pay more for with tax dollars anyway, I'm not listening. The opportunity here is more than 10% of our carbon footprint, and it can be done fairly quickly.

The U.S. EPA estimated that more than 66 million tons of food were wasted in the U.S. in 2019, which is 30 – 40% of our food.[22,23] Table 4 shows a breakdown of how the food waste was managed, or dealt with. More than 60% was sent to landfill, where it decomposed anaerobically, releasing methane

gas and adding nearly 1% to our carbon footprint. The total cost of the wasted food averages about $400 per person per year, depending on where you live.[23,24]

Table 4 - Food Wasted in U.S., 2019[22]

Management Pathway	Quantity Managed (Tons)	Percentage Managed
Donation	5,135,293	7.76%
Animal Feed	1,516,771	2.29%
Bio-based Materials/Biochemical Processing	2,335,988	3.53%
Anaerobic Digestion	538,539	0.81%
Composting	3,304,764	4.99%
Land Application	141,371	0.21%
Controlled Combustion	9,646,263	14.57%
Landfill	39,621,902	59.84%
Sewer/Wastewater Treatment	3,975,352	6.00%
TOTAL	66,216,242	100.00%

About half the produce we pitch is still edible, and simply not perfect to look at. Thousands of tons never leave the farm, and as much as 20 to 40% of fresh produce is discarded because it doesn't meet retailer's specs for uniform, perfect appearance. How we personally shop and handle food is the biggest overall waste, at 47%, and restaurants are the next biggest, at 37%. Grocery stores discard 20 million tons of produce annually, for inane reasons such as yellow peppers having some green on them, or bell peppers with 3 chambers instead of 4. We've reached an absurd culture of perfection, if you ask me. And being picky is contributing a lot more to our carbon emissions than you may have thought.

There are increasing numbers of food banks, and about 8% of wasted food is getting redistributed through local food banks. I served on the board of Denver Food Rescue,[25] a nonprofit organization that collects fresh vegetables from local stores, restaurants and gardens, and distributes it to inner-city residents through no-cost grocery stores. This is huge, because inner cities like Denver often lack healthy food resources, particularly when residents have limited ability to travel, and may be stuck with the limited unhealthy processed and packaged options at the corner stores.

Myth: Expiration dates mean the food has gone bad.

Truth: Foods sold in grocery stores often have a stamped expiration date. The dates are not actual spoilage dates, but rather recommendations by the manufacturer for when the food is at peak quality. A study in the UK estimates that 20% of avoidable household food waste is due to confusion over expiration dates. These dates are not an indicator of when the food becomes unsafe to eat, but rather what manufacturers provide retailers to assist in rotating stock and inventory.[24]

A new grocery store chain in Denver and Boulder, Nude Foods, sells bulk groceries, and hosts rescued fresh produce at their stores, where customers can take all the produce they want for free, as long as they buy something too. Seems fair to me! I shop there all the time, and I try to take as much rescued food as I can, bring it home and use it within a couple of days. Bruised apples and bananas can go in the next smoothie, and potatoes and squash in the next soup. It's not hard, and I think it's actually easier to plan meals with specific ingredients to plan around. My point is that, not only can we save carbon footprint and money by not wasting food that we buy, there are opportunities to consume food that's going to waste for free, and save even more carbon footprint and money. You just have to look around. I saw a film several years ago called "Dive"[26] in which a young couple in California with a small child were living entirely on discarded food collected from dumpsters

behind grocery stores. They had an entire circle of friends and they did it together and built a culture around it. For them, it was an act of conscious peaceful rebellion against unsustainable societal norms. Now the "rescued food" movement is making it more official (and legal). Just a beautiful thing and way overdue.

At home, we may waste without even realizing it. For instance, are you in the habit of peeling potatoes? I thought that was an absolute necessity, until I learned about all the nutrients that are lost by doing that. Half the fiber, about a third of the vitamin C, and a huge portion of the vitamins and minerals are lost by peeling the potato. And, the peels add to flavor and mouthfeel. Not only that, peeling is tedious. What a pain! I've even cut my finger with the paring knife. And, unless you're composting, the peels go to the landfill and decompose anaerobically, adding to our carbon emissions. And for what? What a waste! Now I just chop up the potato, peel and all. Done and done. I don't peel carrots either, because it's just a waste of food and time. I just wash them off. Since I only eat organic food, I know there are no toxins on the outside, and the dirt washes off easily. Same for fruits, bell peppers, tomatoes and most kinds of squash. Think about that. Green onions, eat the greens. Apple seeds, maybe not so much; they contain cyanide. Don't worry, I don't eat banana peels or avocado pits. If you're not sure, search the internet on it. If it's palatable with decent mouthfeel, it's probably fine.

> "Consumers are responsible for more wasted food than farmers, grocery stores, or any other part of the food supply chain. The lettuce that went bad. The leftovers you never got around to eating. And that scary science experiment in the back of the refrigerator." Dana Gunders, staff scientist for the Natural Resources Defense Council.

The All-American Diet

The carbon footprint of U.S. food is an obscene 4.64 metric tonnes per capita, which is 20.7% of our total carbon footprint, and about the same as the entire carbon footprint of Europeans on average. It is 200 times as much as the entire carbon footprint of someone living in Burundi. Think about that. Are you embarrassed? I sure am. I mean, doesn't that feel like the absolute height of inequity? For reals? So, can we really be that bad? The answer turns out to be yes, we can. And we are. Then a decent follow-up question might be, so, um, HOW can we be that bad?

The answer turns out to be really pretty simple. Our eating habits are absurd. In addition to eating foods grown with poisons, we eat too much meat and dairy and too much processed food laced with too much sugar. Not only are these the foods with the highest carbon footprints of production, they are also the most dangerous things we can put in our bodies. We are literally sickening ourselves with our horrible diets, leading to some of the highest rates of heart disease, obesity, diabetes, autoimmune diseases and cancer on the planet. Then, when these diseases catch up with us in life, we demand all kinds of pharms to keep our sorry sickened and tired bodies dragging along, polluting the water every time we take a piss laced with extra pharms and sickening and killing ever more of the wildlife.

And, we don't hear as much about this as we should, because big corp, specifically big meat, dairy, sugar and, yes big pharm, makes a lot more money if we eat more of this food, and then get sick later in life. In fact, we hear the opposite, as we're deluged with commercials to "Eat Beef! It's What's For Dinner!", or "Got Milk?" and, of course, there's always the beautiful happy skinny models drinking all those cold luscious Pepsi's in the hot sun while doing something

gloriously fun and athletic. Think about that. Do you really, seriously think those models really manage to drink Pepsi like water and stay skinny and beautiful? Hello? And don't miss the life-saving pharm commercials that will save you at the last second – just talk to your doctor! Just try not to think about the incentives they're getting for the pharms they sell. And never mind about the risk of high blood pressure and waxy secretions. You'll just be ever soooooo happy!

Figure 2 shows a comparison of carbon footprints for several foods that are commonly consumed in the U.S. The emissions are in units of LBS CO_2e per LB of food, to make it easy to compare personal consumption. You can see that beef is by far higher than plain old raw fruits, vegetable and nuts. Even eggs, olive oil, pig and poultry are a tiny fraction of the footprint of beef and dairy. So, if you're big on beef, know that you can make a huge difference across the board by cutting back. Especially since overconsumption of said beef, along with other meats and dairy foods, is likely sickening your body, either now or in a matter of time.

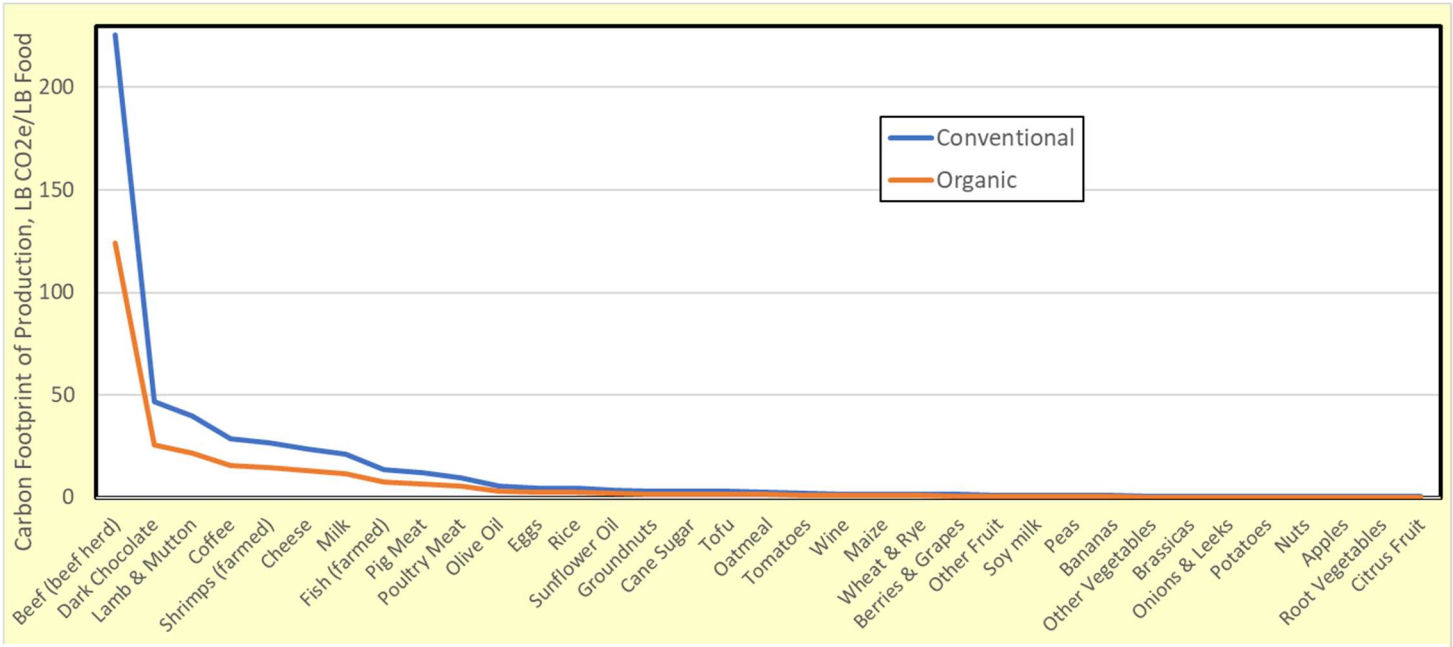


Figure 1 - Carbon Footprints of Agricultural Food Production [27,28]

When I say we have a lousy diet in the U.S., I specifically mean that we're eating too much of the wrong foods. It's pretty obvious from our obesity rates, with about 38% of the population in the U.S. obese.[24,29] Even scarier, obesity is even increasing in children.[30] And it's not genetic. It's how their parents feed them, because that's how they eat, because that's how their parents fed them. Obesity is defined as extra weight amounting to 30% or more of a "normal" range for your height. Taking the 30%, which is the minimum level for obesity, and the fact that 38% of the population is obese, it's not unreasonable to figure that if we got rid of obesity, we'd reduce our carbon emissions of food production across the board by 11% of food, or nearly 3% of our total carbon footprint. The actual potential here is probably a lot higher, because there are a lot of obese humans with significantly more than 30% extra baggage. Ironically, obesity is currently killing more people than famine.[6]

The average American eats about 8 oz of meat per day, which is more than twice the USDA recommended 3.7 oz/day.[31] And, if that's the average, that means the total meat consumed by America, divided by the population, which doesn't capture the extreme ends of the spectrum. I mean, obviously babies and young children don't eat that much, and vegetarians are clearly out of the picture, which means there's an extreme population that's skewing the average upwards. Gee, I wonder who that could be? Perhaps the 38% of obese humans in this country? Just a guess. And then there's the dairy, which is just as horrible for us in terms of contributing to obesity and western "diseases of affluence".[32]

> " We need a new definition of malnutrition. Malnutrition means under- and over-nutrition. Malnutrition means emaciated and obese." Catherine Bertini, Executive Director of the United Nations World Food Programme, 1992 – 2002.

It turns out that the primary protein in beef and dairy is casein, which is also the primary protein in us humans. And, while it might seem like a great idea to get our protein from cow products, the problem with that is that our bodies are mainly set up to make protein for our cell building and such on an as-needed basis using plant proteins that are broken down into basic amino acids that are then used to construct needed proteins.

Basically, our bodies are not set up to break down casein, for example, so when we consume it, it gets "shunted" in some random way. Our bodies are resilient, and can get rid of some overconsumption, but extreme overconsumption accumulates, and ultimately causes chronic, life-threatening conditions, such as cancers and autoimmune diseases like rheumatoid arthritis, rheumatic heart disease, multiple sclerosis, Crohn's disease, hyperthyroidism, lupus and chronic active hepatitis, to name a few. In the U.S., a quarter million people are diagnosed with an autoimmune disease every year. Some people even have more than one. Autoimmune diseases in particular suck because the body literally attacks itself in one way or another, leading to misery in life, lots and lots of daily pharms, and early death. Sound fun? I don't think so either.

> I never really developed a whole lot of love for beef in life. I think it's because I developed a bad taste for it as a child. We'd have a Sunday steak dinner that was supposed to be the ultimate privilege, and I positively hated it. I would chew and chew and just couldn't get it past the gums without chasing it with a bunch of milk. I wasn't allowed to leave the table until I finished my dinner, and I got in trouble for trying to feed it to the dog under the table. I did, however, have an undying love for cheese, and always ate more of that than necessary. Later in life, our dad gave us a Wyoming steer for Christmas, cut however we wanted. I got some cuts for Hilary and our sons, then had the rest ground up so I could use it in burgers, burritos, chilis and the like. We had to store it in our basement freezer and I was horrified at the electricity usage, so I was putting beef in everything to get rid of it. In March of that year I was diagnosed with breast cancer, and I read the China Study. I immediately stopped eating beef as well as cheese and milk. I gave the rest of the beef to my sister for her dogs. 16 years later, I'm still cancer-free, and I hope it stays that way.

Table 5 shows the leading causes of death in the U.S. in 2020, and pretty much all of them are linked to poor diets that are too high in protein, mainly animal protein, sugar and obesity.[32] We truly are what we eat. And we all know this. So why don't we do something about it? You'd think this would be a no-brainer. It sure would be a big help for our planet and wildlife.

Table 5 - Leading Causes of Death in 2000 [33,34]

Cause of Death	Deaths
Heart Disease	710,760
Cancer	553,091
Medical Care (Errors, Unnecessary Surgery, Hospital Borne Infections, Adverse Drug Effects)	225,400
Stroke (Cerebrovascular Disease)	167,661
Chronic Lower Respiratory Diseases	122,009
Accidents	97,900
Diabetes Mellitus	69,301
Influenza and Pneumonia	65,313
Alzheimer's Disease	49,558

We can get all the protein we need from plants, and from other sources of meat that are significantly healthier and have a lower carbon footprint, like chicken and pork. Eggs, which have been maligned for years because of their cholesterol content, are an awesome source of protein, and the cholesterol isn't an issue at all in moderation, especially if you don't eat much meat.[35] And, eggs are easy to produce at home, if you have a yard. We had chickens for many years, and it was extremely satisfying to harvest those fresh eggs each morning.

Even though the best thing we should be eating for our own health and that of our planet is fresh unprocessed food from plants, it's astounding to me how many of us don't have any idea where our food comes from. Seriously, "per the USDA, the most popular "fruit" is orange juice, while French fries and potato chips have become our "top" vegetables. 40% of elementary school kids don't know that hamburgers come from cows, and more than 50% don't know that pickles are cucumbers, or that lettuce and onions are plants." Cecily Upton, co-founder of FoodCorps

Figure 2 shows that chicken and pork have less than one tenth the carbon footprint of beef, and it's because they metabolize their food much more efficiently, meaning the meat product per pound of feed is higher. Also, they don't spew as much methane. That's why the CO_2 emissions per gram of protein from cow products averages 2.5 LB CO_2e/gram of protein, while for chicken and pork it's about 0.1 LB CO_2e/gram. And it's even lower when it comes to vegetable protein, at 0.06 for legumes, brassicas and root vegetables. Ground nuts are really low, at 0.03 LB CO_2e/gram of protein, and pack an astounding 114 g protein per pound of nuts. Which means they're about 25% protein. This is about twice the RDA for protein, which is 50 g/day. Think about that. We could literally eat a half a pound a day of peanuts (about a cup) and get all the protein we need, along with all the carbohydrates and dietary fiber, and more than enough fat. Of course, we'd want to balance that with other vegetables, green leafy vegetables, root vegetables and fruits to get the other nutrients we need. Again, we don't need or want a bunch of carbon-spewing meat for good health.

If we reduced the U.S. total consumption of beef and dairy, and consumed only unprocessed plant foods, we'd reduce our carbon footprint by about 15%, right there. And, we'd be far healthier for it. In the US, we eat about 60% more protein than we need. Even vegetarians get more than they need.

The point is that we can eat a lot less protein, and be just fine. And, we don't need to all be vegans, we can eat 90% less animal products and make a huge difference for our planet and for ourselves. It turns out that the only vitamin in the human diet that we actually need that comes mainly from animal products is vitamin B12, which is in eggs and shitake mushrooms. And, while eggs do pack the dreaded cholesterol, our bodies do need a certain amount of cholesterol, and one egg provides the RDA, as long as we're not eating a bunch of meat and dairy along with it. Also, our livers produce whatever cholesterol we may lack.

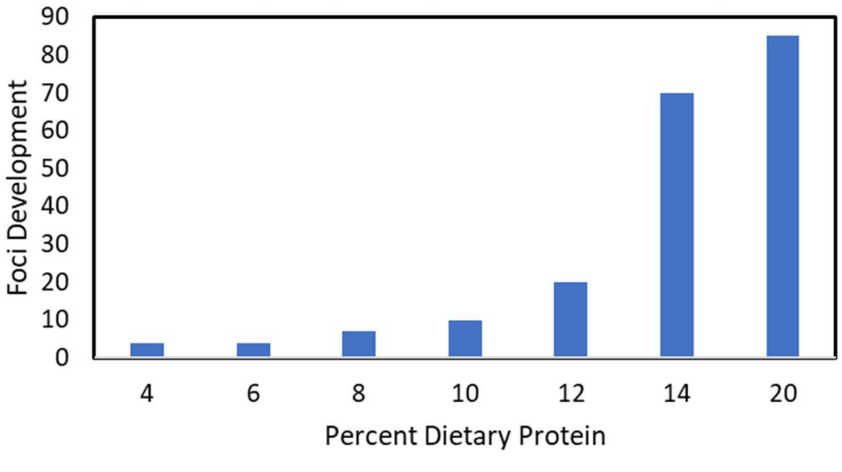
Gordon, my first supervisor at Coors, proposed that anyone who eats beef should tour a meat packing plant, because people generally are too far away from their food, and have no idea where it comes from. I agreed with him, and when I had an opportunity to tour the Cargill meat-packing plant in Fort Morgan, Colorado, I jumped on it. It was part of a Colorado School of Mines class on Industrial Waste Minimization that a friend was teaching, and that I was guest-lecturing a class on industrial waste minimization at Coors. The environmental engineer for the Cargill facility was a Mines alumni, so it all fell into place. One of the students was actually a vegetarian. I'm glad I did it, and I learned a lot. Very eye-opening and I highly recommend it. If you're gonna eat meat, you should seriously at least witness the slaughter once if you're too lily-livered to go out and shoot it for yourself. Like I am.

Studies show that vegetarians tend to have lower rates of heart disease, high blood pressure, type 2 diabetes, and obesity. Sticking with fresh plants prevents a bunch of other diseases that will cause us to be medically needy and further weigh down the environment as we age, all because we couldn't even treat our own bodies responsibly, much less the planet. The American Institute for Cancer Research recommends the following guidelines for cancer prevention: 1) eat a variety of vegetables, fruits, whole grains and beans; 2) limit red meats (beef, pork and lamb) to 2 – 3 oz/day, and avoid processed meats; 3) avoid sugary drinks; 4) be physically active every day in any way for 30 minutes or more; and 5) aim to be at a healthy weight throughout life.[36]

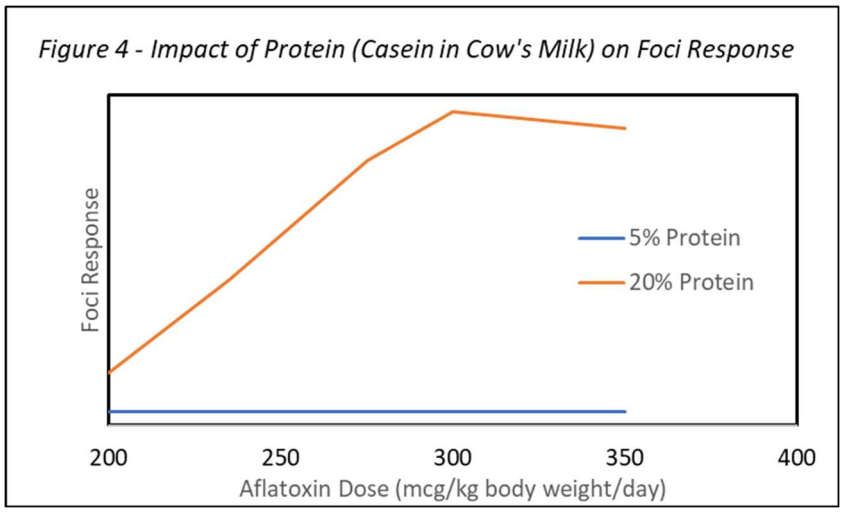
Paul McCartney has been a vegetarian for 40 years. He's 75, feels great, still sells out concerts. He's leading a "Meat-Free Monday" campaign.

In the China Study,[32] Campbell's research teams utilized microscopic cells called foci, that are precursor clusters of cells that grow into tumors. While most foci will not become full-blown tumors, they are predictive of tumor development, in that the more foci there are, the higher the potential of tumor development. They fed lab rats aflatoxin, a mold from peanuts that's known to cause liver cancer. Then they put the rats on diets of different levels of protein as casein in cow's milk. Figure 3 shows that as dietary protein increased above 6% of total nutrients, foci development also increased, and the increase was really dramatic above 10%, reaching foci levels so high at 20% protein that cancer would be pretty much inevitable.

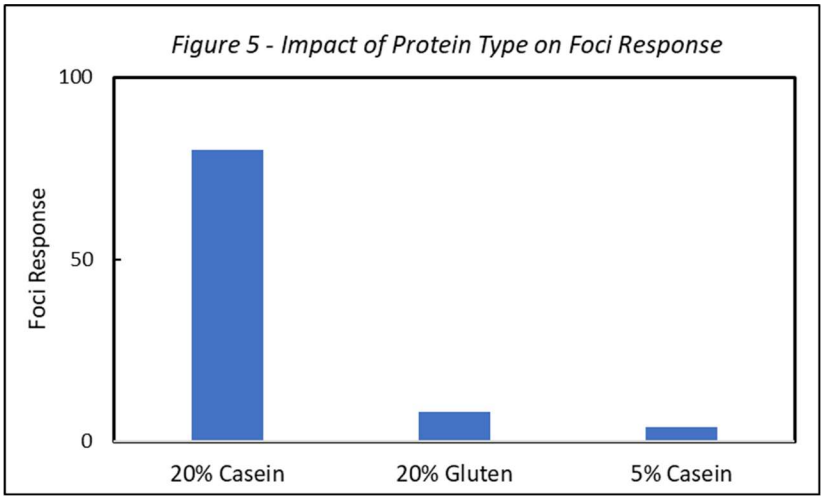
Figure 3 - Impact of Dietary Protein on Foci Development



The researchers followed up with additional studies, one in which they fed diets with 5% and 20% protein, and increased the aflatoxin. The results, shown in Figure 4, found that there was no increase in foci development at a protein level of 5% no matter how much aflatoxin was fed, while at a protein level of 20%, foci increased with increasing aflatoxin.



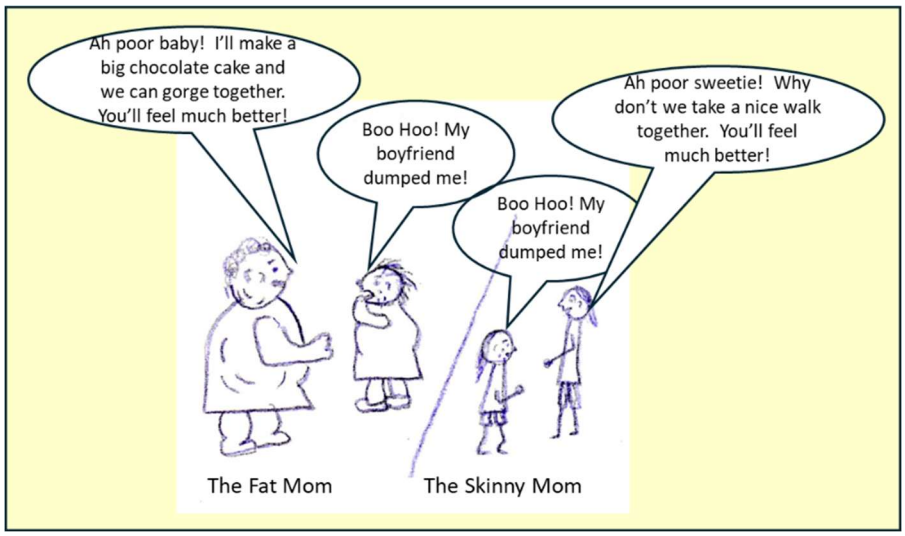
In another study, they compared casein, the primary protein in beef (and also in humans) with gluten, the primary protein in wheat. Figure 5 shows that foci response is several times higher at 20% casein compared to 20% gluten. It also shows that 5% casein resulted in slightly less foci response than 20% gluten, and was a tiny fraction of the foci response at 20% casein. These experiments have been repeated and built upon by testing other plant proteins, such as in soy, and the results verify that a diet high in protein, particularly casein, significantly increases risk of cancer.



I don't know about you, but these results definitely compel me to keep my total protein at less than 10% by weight of my nutrients, particularly protein from beef, meaning not only the meat, but also the milk and the cheese.

Of course we all have different body styles and we don't need to all be skinny and look like models. Some people are naturally large or stout and others naturally small, but do we need to be so

obese that it interferes with our health while increasing our carbon footprint? It's simply another matter of balance.



It turns out that humans are actually naturally inclined to gluttony, after evolving to survive periods of starvation followed by plenty followed by starvation, always taking advantage of successful hunts and harvests to survive through times of scarcity. Now, in much of the world, including in the U.S., we have access to just about anything we want whenever we want it.[37] So now, it's up to us to learn to control our natural instincts to avoid unhealthy gluttony. While genetics may play a role in obesity, at the end of the day, we all have those same instincts to gorge, and there is a very good case that we simply tend to eat how our parents taught us to eat, because that's how they ate, because that's how their parents ate and taught them to eat. Think about that. Are you going to argue? Seriously?

Obesity-related medical care costs in the U.S. amounted to more than $200 billion in 2006, and continue to increase.[38] And then there's another $60 billion or more that we spend trying to keep the weight off to begin with.[39]

In addition to meat and dairy, sugar is at the bottom of obesity, diabetes, cancer, gout, even Alzheimer's, and many other chronic diseases that result from these basic underlying conditions. It's in pretty much all processed foods, which is yet another reason not to consume processed food if you value your health, your life and our planet. Just go to the grocery store and read the labels. There is a huge force that includes myself, that maintains that processed sugar should be illegal. I'm willing to bet that the lives ruined and shortened because of processed sugar likely add up to more humans than those ruined by regulated substances such as recreational drugs, alcohol and even cigarettes combined. Just saying.

Recent research shows that, while we've been led to believe for the past 50 years that dietary fat is the root of all evil, it turns out that the real culprit all along has been sugar.[40] In the 1960's two known scientists, Mark Hegsted, administrator of human nutrition for the US Department of Agriculture, and Fredrick Stare, chairman of Harvard's nutrition department, were paid $6500 (equivalent to about $50k today) by the Sugar Research Foundation, a trade group, to place the blame for things like heart disease on high fat diets instead of high sugar diets.[41,42]

Big companies have been manipulating or subverting science, paying and pressuring researchers, academics and politicians to sway results, spending billions of dollars funding fake studies that support their dangerous products. Think about that. Who, at the end of the day, pays for all that hard work to defend toxic products? Um, you, if you happen to buy their products. At the end of the day, if you consume nasty big corp processed foods that contain sugar, you are paying with your own dollars to perpetuate these myths, as you contribute to your own premature demise and the demise of our planet. And only you can choose to knock it off. I'm not aware of any plans big corp has to stop brainwashing us.

One of the most profitable businesses for food manufacturers is cereal. It's one of the only industries that can turn an inexpensive ingredient (i.e., processed grains) into a pricey commodity. The R&D department for General Mills, called the Institute of Cereal Technology and located in Minneapolis, is home to hundreds of scientists whose sole purpose is to design new and tasty cereals that can command a high price and last for a long time on the shelves.(Craig Weller, http://www.barefootfts.com)

Robert Lustig, an endocrinologist from University of California at San Francisco and probably the most notable sugar researcher working today, suggests a maximum sugar intake of 27 – 30 grams/day. The FDA recommends 50 grams/day, which leads to the reassuring percent of RDA on required labelling that might lead one to believe they can consume a particularly sugary product with plenty of room to move. Which is dangerous nonsense driven by big corp dollars and lobbying.[44] Lustig research shows >100 grams/day is toxic.[45]

In the U.S., the current average sugar consumption per capita, including children, is 120 – 164 grams/day. Just one 20-oz bottle of Mountain Dew has 77 grams, and a 15.2 oz bottle of Minute Maid apple juice contains 49 grams. Sugar is just another easily abused substance like nicotine and alcohol with life-threatening consequences. Think about that. I mean, if big corps like Coca Cola are fighting the science with their own scientists who are trying to prove that sugary soft drinks have nothing to do with making us fat or making us sick or making us die before our time, wouldn't that alone suggest that they should be irrelevant? Ya think? Hello? McFly?

I was very lucky growing up. Our mom kept sugar at a minimum in our house, and we didn't have pop of any kind around. This was because our grandfather was insulin dependent diabetic, and we had a cousin who was born insulin dependent diabetic. She didn't want that to happen to us. She didn't go so far as to monitor our consumption at our friend's houses, figuring we'd end up having some pop now and then in life, which we did. For us, a pop at our friend's house was a rare act of rebellion, and not every day consumption. While at the time we may have sometimes felt deprived, I'm forever grateful to my mom for seeing to it that we got a healthy start in life. I think that's a huge reason I remain healthy and pharm-free today, at age 66.

The horrible truth about sugar is it's practically stuffed down the throats of innocent children, with commercials for sweets during children's shows on T.V. Does it get any nastier? Pushing toxic products on kids who don't know any better, ensuring they get off to the worst possible start in life by poisoning their little bodies right from the get-go, forcing them to develop tastes for crap like soda pop, that should never be produced and should never enter their bodies. Ever. And the production of these horrible products are impacting our environment. The energy and water needed to extract pure sugar from raw sources is enormous, and can be easily mitigated by just eating a freaking piece of local fruit that is far and away healthier for us. Like maybe an apple?

So, what's the big deal? Why is it a problem for the environment if individuals choose to poison themselves with dangerous foods they shouldn't be eating? The problem is, when these products are chosen by the consumer, they support the large-scale manufacturing of the products, keeping them on the shelves, taking space where other, healthier, products should go. By supporting these products, the consumer also supports the extra carbon footprint of the manufacturing, along with the extra carbon footprints of medical costs to deal with their self-inflicted diseases. Pharmaceuticals have huge carbon footprints of production, are typically grossly over-packaged, usually in layers of plastics, most of which aren't easily recycled. Pharms do not completely metabolize in the body, so much of it passes through to surface waters through wastewater when they get peed out, deforming, sickening and killing wildlife. We are what we eat, and what we eat is either for or against our planet.

Doctor – "You have a terminal disease"

Patient – fat guy – "Oh No! I guess I'll have to start eating healthy."

Dr – "Too late for that. But, I can always prescribe some drugs to ease the pain and maybe getcha another week of life as an invalid."

And since big corp is really good at taking advantage of the latest fad, for the past several decades they've been working hard to convince us that supplements will save the day. After all, if none of us is eating a healthy diet, then we can always pop a few pills to fill in the gaps. It turns out that most of this is just more overprocessed snake oil. Ethical science, while it lasts, has been finding that there's absolutely no value in supplements, from vitamin pills to protein powder, except in unique circumstances. Vitamin E, for example, has been touted as a way to prevent heart disease, but there's no conclusive evidence of that, and in fact the evidence shows that in general supplements may do more harm than good.[43]

Supplements may actually be necessary for high performing athletes and certain medical conditions that prevent proper metabolism of needed nutrients. For example, Hilary and I definitely take electrolytes when we're climbing big mountains, because it's literally dangerous not to replace our salts. However, we pass on the sugary Gatorade, preferring our own concoctions of potassium bicarbonate, dolomite, and turmeric mixed with water in our reusable water bottles, flavored with a few drops of peppermint and lemon essential oil. Works just fine, and prevents cramping in addition to the salt replacement. We purchase these ingredients in bulk, and they are basic, minimally refined, but not ultra-processed ingredients.

Sadly, when it comes to fish, while it might seem somehow better than beef, it's not. Actually, it is definitely healthier to eat than beef, but the problem is that we've fished most ocean stocks pretty much to death because of our sheer numbers and excessive demands, so, for now at least, it's best for the general public to simply stop eating them and let them recover. And, just as bad are the horrendous human abuses that underlie big corp fishing practices, in which young men desperate for work sign on to a fishing boat find themselves trapped on cockroach-infested trawlers that are barely seaworthy, where they are abused, enslaved without pay and sometimes murdered.[46,47] Think about that the next time you buy a cheap can of tuna from Costco. Do you really think that cheap fish comes without human and environmental costs? Do you even

"Ships from wealthy nations are starving coastal communities of the food source they have relied on for millennia. This is modern colonialism at sea. Humans have always gathered food from the sea, and biologically there's no reason that that cannot continue to happen. Indeed, many fishing operations and fishing communities do fish sustainably. But there are some forms of fishing, and some locations where fishing occurs, that damage the ocean for all of us." David Attenborough[48]

think about that? The reality is that when you make those choices, you are choosing to support child labor, human bondage, wrecked ecosystems, de-finned sharks and poaching, to name a few of the horrors.

And it's not just tuna. It's all fish. Swordfish, snapper, mahi mahi, mackerel, sardines, squid, and anchovies are all tainted by slavery. So are farmed salmon, farmed shrimp, and cat food, which depend on fish meal made out of small fish and krill caught in fisheries with human suffering. You can buy certified sustainably caught fish at responsible grocers for a fair price, but even that's a misnomer. When we've trashed all the oceans, there is no such thing as sustainably caught fish. We have to leave the ocean alone and let it recover to have any hope at all for future sustainable fisheries. In as little as 5 years we could be back in business, though to a much more realistic and limited extent that balances the ocean's capacity to produce with our overpopulation. Think about allowing a fish dinner once a quarter instead of every week or every day. That simple consideration would help the planet a lot.

> "Ask no questions and you'll be told no lies", Charles Dickens, Great Expectations

Down on the Pharms

Compared to people in other rich countries, people in the U.S. spend the least on food (as a percentage of income) and the most on health care.[8] In the U.S., we spend more than $4 trillion on health care, much of which could be avoided simply by eating organic plant foods, avoiding processed food and minimizing meat and dairy. Typical conditions like high blood pressure, high blood sugar (type 2 diabetes) and high cholesterol and resulting diseases are shortening our lives by an estimated 13 years. This shouldn't be too much of a shock, considering about 70% of our calories are from processed foods, containing thousands of artificial food additives, many of them known to cause cancer.[49] Healthy behaviors could eliminate 90% of the diabetes, 80% of the coronary heart disease, and nearly half of the cancers that afflict Americans. It turns out that most medicine is focused on curing, rather than preventing disease. Typically only 3 – 6% of all health care costs go to prevention, while about 75% of costs go to treating preventable diseases.[50] Think about that. Is that pop or candy or hamburger really worth all that suffering, cost and environmental destruction? Really?

Take Dementia, afflicting about 57 million people globally, about 12% in the U.S., with medical costs in the trillions of dollars.[51] Dementia is an overall category of brain diseases that includes Alzheimer's disease, vascular dementia, Lewy Body dementia and frontotemporal dementia. Risk factors that are increasing dementia include obesity and diabetes. Alzheimer's is caused by accumulations of proteins that damage and kill nerve cells. Notice the word "protein" here? It turns out that the protein in meat and dairy are linked to dementia, yet we continue to eat too much of it. While fat has been blamed for many of our medical problems, it turns out that we really do need fat, and we also need protein, but too much protein, animal protein in particular, causes disease.

> "No diet will remove all the fat from your body because the brain is entirely fat. Without a brain, you might look good, but all you could do is run for public office." George Bernard Shaw

Of course, those health care costs largely involve pharmaceuticals, which ultimately poison the environment and wildlife. Take Alzheimer's, which can't be cured at this point, but must be lived with, and can likely be avoided with a healthy diet. The latest big pharm offering is a new drug called Lecanemab, which costs about $26,500/year, in addition to regular brain scans that bring the cost up to $90,000 per year. Patients must endure biweekly, hour-long infusions of the drug, and side effects

include potential swelling of the brain and brain bleeding.[52] Does that sound like the cure might be worse than the disease? Yeeeesh.

> "Maintaining order rather than correcting disorder is the ultimate principle of wisdom. To cure disease after it has appeared is like digging a well when one feels thirsty, or forging weapons after the war has already begun." Huangdi Neijing, 2nd Century B.C.

Drugs in America today may be causing more damage than the problems they are supposed to solve. Not only are many drugs toxic chemicals themselves, but they also contribute to nutrient depletion as a side effect.

These days, the average senior citizen in the U.S. may take up to ten prescription drugs every day. Does that sound extreme? Like, yah? Think about that. Gee, I wonder if that's making matters worse within our bodies, not better? Ya think? I mean, every single one of these needs to get in line within our bodies to be processed out by the liver, and they all interfere with metabolism, absorption and uptake of nutrients that we actually need for our health. And they all have nasty side effects that make things worse. Like Beta blockers that are used to manage cardiac arrhythmia and high blood pressure, deplete the body of coenzyme Q10, which is needed to maintain heart functioning and normal blood pressure. Or statin drugs, used to lower cholesterol, also deplete Q10, calcium (needed to regulate bone strength, blood clotting and cell strength), and beta-carotene (a vision and immunity booster).[53]

Good Eating

Henry Kissinger had a good point, and a scary point. And what he warned of is happening now. Big corp is controlling most of our food, and, we actually do have to eat. They're even patenting their seeds, so they can't be legally propagated without paying them. Really ugly. The only way to resist this is to buy from local, organic farmers. And no, you don't have to go to the farm. Farmer's markets are pretty much everywhere these days, at least in summer, and year-round in warmer regions. Please don't blow them off and head to the nearest Walmart or Costco, where the food is mostly grown with toxins, acquired at the lowest possible price, came from hell and gone, and is typically overpackaged. There are also year-round local food and rescued food programs, at least in many larger municipalities, and this trend is growing. In Denver, we have Denver Food Rescue, as well as Denver Urban Gardens, a local group of community gardens, and even GoFarm, where you can order local food year-round. A lot of this food is free. Denver Food Rescue doesn't even screen for income, you just go in and get what you need. A new progressive grocery store in Boulder and Denver called Nude Foods, and another in Denver called Leever's Locavore, focus on local foods. It can be done. Seek out opportunities where you live. If you can't find decent local foods, pester your grocers about that. After all, you are the customer. Act like it.

> "Control oil and you control nations; control food and you control the people." Henry Kissinger

At home, more than 90% of our food is organic, purchased in bulk and local. The processed food we consume is mainly vegan products like cheese, pasta, vegan meats and bread, and most of this is organic. All the condiments we consume these days come from Nude Foods, where they are sourced locally and come in returnable jars. The store has a commissary that produces amazing organic vegan salad dressings, mayonnaise and salsa, which we buy for convenience. I used to make these at home from raw ingredients, but now that I can get them in returnable containers, why not? Also, Nude Foods seems able to avoid adding sugar at every turn, which is a huge reason why I stopped using big corp condiments in the first place.

There are several great bulk stores in our area where we can get all the beans, rice, grains, flours, pasta, herbs and spices and other dry ingredients needed to produce everything we need from basic ingredients. I make a mean quick bread from gluten-free flours and whatever fruits or veggies happen to be available, usually some sort of squash, like pumpkin or zucchini.

We grow as much of our food as we can in our tiny little yard, and it turns out to be a lot. Most of the veggies are in the back, where they're somewhat isolated from the wildlife, while the front is dedicated mainly to native landscaping in order to attract as much wildlife, mainly insects, birds and other small critters, with a few tomatoes in there. We also have a very productive grapevine, cherry trees and apple trees in the front, all of which get harvested, leaving a little for the birds on the uppermost branches. We have peach trees and chokecherries in the back. We always end up with more fruit than we can consume in-season, so we either can or dry it, so we can consume it in the winter and give it away at Christmas. I'm still using grape juice from last year that I canned, and it's now August as I write this, with more grapes coming soon! I'm always so proud to break out the last squash of summer after the beginning of the new year. Golden, like many cities, has a community garden for those who can't garden at home. There are also farms that allow people to pick their own produce, a great way for an apartment dweller to pick, say, a bunch of tomatoes, take them home and can enough tomatoes to get through winter, in jars that can be reused forever. Where there's a will, there's a way!

During the victory garden movement of World Wars I and II, Americans planted gardens to feed and support both their local communities and troops overseas. These efforts were wildly successful. By 1944, nearly 20 million victory gardens produced 8 million tons of food – around 40% of the fresh fruits and vegetables consumed in the U.S. at the time. This incredible show of grassroots organizing and community efforts are the inspiration for today's Climate Victory Garden movement.[54]

While gardening does require planning and work, it's all a matter of priorities. I know extremely busy people who find time for their gardens. Actually we are those people. We have been gardening our entire 40+ year marriage, through raising a family, dual income, the wife (me) also going to college, and still finding plenty of time to hike, climb, bike and ski. Both of our sons loved to help with gardening, and now they are both professionals, working at Washington Park in Denver, where they are converting the gardens to native landscapes and maintaining the landscaping. The things we didn't do so much were excessive gaming, T.V. and social media, time sucks that we don't feel add value to life. To us, gardening is life, and without it, life would seem empty. The self-reliance and satisfaction of growing and putting up our own food can't be matched any other way. And, by doing it ourselves, we can be absolutely certain of no poisons and no damage to wildlife in the production of our food.

It's hard to imagine anything easier to grow in a home garden (besides zucchini) than leafy greens. Between the kale, spinach and urugula we end up with more than we can eat. Which is great, because they're linked to a slower rate of cognitive decline with aging. In fact, at least one study showed that those who ate one to two servings of leafy greens per day had a rate of decline equal to being 11 years younger compared to those who rarely or never ate green leafy vegetables.[55] It's also really easy to grow weeds. Yep, you read right. Weeds. Especially dandelions. It turns out that, much as we love to kill them with pesticides, we really should just eat them. Dandelions are nature's richest vegetable source of beta-carotene, the substance which the body converts into Vitamin A. Unlike synthetically produced Vitamin A supplements, beta-carotene is non-toxic in large doses, because the body regulates its conversion to Vitamin A. Dandelions contain about 8.4 mg of beta-carotene per 10 gm., higher than

carrots, which contain 6.1 mg/10 gm. They're also high in fiber, potassium, iron, calcium, magnesium, phosphorus, and the B vitamins (thiamine and riboflavin).[56]

There are a lot of weeds that are plentiful and good for us, that require no tending, and we consume whatever we can find in our yard. Since they haven't been domesticated, weeds have been forced to cope on their own in nature, relying on their own chemical and biological defenses. It turns out that many of these chemical compounds function, when consumed by humans, as phytonutrients and antioxidants.[24] Purslane has six times more vitamin E than spinach and fourteen times more omega-3 fatty acids. It has seven times more beta carotene than carrots.[57] Two of the most nutritious plants on the planet are purslane and lambsquarters, common weeds found around the world.[58]

We have a weekly "juice fast" day, in which we eat only food that's liquefied in our blender. The point is to allow our bodies to purge any toxins that have accumulated throughout the week by going easy on that day. It's a great way to move any fresh produce that needs to be used up. Breakfast smoothies are mainly fruits, lunch smoothies are greens like dandelions, kale, spinach, Jerusalem artichokes and other veggies, and dinner smoothies are pureed soups with squash, potatoes, tomatoes, onions, bell peppers and such.

"You can sum up healthy eating in seven words: Eat food. Not too much. Mostly plants." Michael Pollan, Food Author[58]

These days, we like to have breakfast bowls, usually based with whole grains like home-made granola, oatmeal, quinoa, potatoes or polenta, with fruit or vegetables on top, maybe an egg. Berries are big for us, brightly colored fruits are full of antioxidants. In our house, fresh tomatoes go in nearly everything, again, they are full of antioxidants. We love avocado toast, plain old eggs and turkey bacon and potatoes, or English style with eggs, beans, tomatoes and vegan sausage. Chilaquiles, a Mexican style breakfast with either real chorizo (it's made from pork) or a vegan version. We also use jack fruit, an absolutely awesome fruit with a very convincing mouth feel when it comes to meat substitute. Sometime Hilary will make waffles for a special treat, dressed up with fruit and such. I love to make quick breads with home-grown squash and apples, with gluten-free organic flours like chickpea, oat and coconut flour.

When I married and moved out, I made sure to copy my mom's recipes. At the time, that meant actually copying them down by hand. One of my favorites was red chili. The entire recipe was cans of this and that. There were several cans of different types of beans, different sized cans of chopped tomatoes, tomato paste and tomato sauce. And, of course, lots of ground beef. When I look back, it seems that all the recipes in the cook books involved cans of prepared food. These days, I buy everything in bulk, no cans at all! I soak the beans a few days ahead, and use fresh tomatoes that I chop and reduce. Instead of just throwing the beef in there, I offer a little grass fed beef or buffalo on the side, if anybody really must have meat in their chili.

Lunches are often some kind of leftovers from other meals, and sometimes we skip it if we had a big breakfast, and go for an earlier dinner instead. I love to make a huge batch of soup or chili and then use it during the week. I have a favorite deli that I love to go and get a sandwich, and both of us love to simply do chips and homemade dips to snack through lunch. We'll do anything from hummus to baba ghanoush to guacamole to salsa to chili con queso with vegan cheese, just whatever is around. Hilary loves to simply snack on nuts and fruit. We get tortilla chips and potato chips in returnable jars from Nude Foods these days, made locally from organic vegetables, so we can finally have guilt-free chips without resorting to our TerraCycle box for recycling the plastic bags. How cool is that?

Dinners are soups, salads, nachos, stir fries, vegan pastas like gnocchi or the all-time favorite, mac and cheese, only these days it's vegan, laced with tomatoes, olives, pine nuts, garlic and such, and I absolutely love it when Hilary does cauliflower, chicken wing style. He also loves to make chicken dishes like chicken enchiladas and just chicken with veggies like potatoes or asparagus. He'll get a hankering for spaghetti and sometimes grills up some pork with veggies. He also makes a mean pizza with a perfect crust with dough that he ferments for three days. We'll have family celebrations and offer taco bar or salad bar or a grill that includes meat and vegan substitutes. We never waste food. Anything that's on its last leg gets thrown in the next soup, salad or stir-fry. I love planning meals literally to get rid of something that needs moved, a purposeful way of eating to consume what's available. It actually makes meal planning simpler and more fun, at least for me. Find a way to use what we have. It's almost like a game.

Human beings are nature. Instead of a single being, the human body may be more accurately thought of as an ecosystem. Adult humans have several pounds of microorganisms living in and on them. In fact, our prokaryotic cells (those cells lacking a nucleus, such as bacterial cells) are greater in number than the eukaryotic cells (those cells with a nucleus, such as our mammalian cells). The bacteria in our digestive system, often referred to as our gut biome, influence our immune system, food cravings, moods, our ability to learn, and much more. They also help us digest many plant foods that we might not otherwise be able to digest. We are only beginning to understand the importance of these symbiotic microorganisms of the human ecosystem, and how to better care for them and thus ourselves.

Being compassionate to other beings needs to extend to the other beings that coinhabit each of us. That starts with being good to our bodies by feeding ourselves healthy, nutritious food, avoiding toxins, and learning where and how to grow food that is healing to ourselves and the planet.[3]

Food lasts longer in our house because of how we manage it. In addition to obvious first-in first-out practices, we are fanatical about avoiding cross-contamination of our food, by always cleaning and hand drying utensils with a quick swipe of the dish towel between uses. In other words, I'm not going to stick a spoon into a mayonnaise jar that I just stirred the quinoa with. That's just asking for it. Food that can oxidize or dry in the refrigerator such as carrots and lettuce are kept in closed containers, and food that is prone to mold, like mushrooms and ginger, are kept in open containers. Mushrooms can actually be kept forever like that, because they'll ultimately dry, and still be perfectly edible, but if you put them in a closed container they'll likely mold within a week.

We keep an open bowl of partially used produce in the front of the refrigerator where we can see it, with what's left of a tomato, an apple, an onion, an avocado, etc., that we may not completely use in a meal, like salad or stir fry. This way, we always use up the last tomato before cutting into another. Instead of hacking into a head of lettuce, which results in rust at the cut, we peel off leaves from the outside of the head, leaving no damage, and significantly increasing the life of the head. Lettuce can be stored for a couple weeks at least, as long as it doesn't wilt or rust. All our bulk dry goods are in labeled glass jars in the pantry, to avoid insect infestations. We don't store food in plastic bags because they're likely to get infested before they're used up.

Basically, we eat extremely well at home, mostly vegan, and a little meat and dairy thrown in. We try to balance our intake of meat, dairy and even breads, since they turn to sugar fairly quickly in our digestive system. For example, if I have real cheese on a deli sandwich for lunch, then I'm not likely to have bread or cheese again that day, or after an egg and bacon breakfast, the rest of the day's meals will be vegetables. It works just fine for us, we're both in excellent physical condition, still able to backpack

and climb mountains in our late 60's, and people are always telling us that we look younger than we are. At this time, neither of us are on prescription meds.

In the U.S., the pet food industry is a $30 billion market, which has a significant impact on our food print. Historically, for our own pets, we bought what we felt was best from an array of bagged and canned food, later switching to bulk supplies. However, as I started to wake up to the damage we're doing to ocean fish stocks, I began to read the ingredients in the food. At this point, we were down to one cat and several fish tanks. To my dismay, I found that every single ingredient list for cat food contained salmon, and every single list for fish food contained krill or some sort of dried fish. Also, organic options were rare, and the few that existed contained salmon. We finally gave up on conventional choices and went to basic foods. We bought an organic chicken for the cat, and Hilary played with on-line recipes for cat food, involving sweet potatoes and such, and finally settled on one that our cat would eat. It was kind of a rough transition, but we all got through it. Cats are definitely picky little critters.

I got online and found some low-impact fish foods, including good old-fashioned dried flies, which they love, red worms, dried tubifex worms and dried *Cerio daphnia* (water fleas). I also continue to feed frozen brine shrimp. All of these are easily raised in tanks, and I'm actually considering doing some culturing at home, purely because I love messing with fish. I'll continue to outsource the flies and worms, however, though these days a fly that's swatted in the house is more likely to be dropped into a fish tank than tossed into the garden. The fish seem to be doing just fine, we have fresh water and salt water fish, and they all eat the same diet, and I feel much better about what I'm feeding them.

Now That's Progress!

Table 6 is a duplicate of Table 2, but instead of the average carbon footprint per capita of food for the U.S., it's the carbon footprint for our own household. Also, for simplicity, only the percentages are shown, since they are easier to rate against our overall goal of 80% reduction in emissions, at least for my engineering brain.

- **Agriculture** – Since meat and dairy comprise less than 5% of our diets, and less than 5% of our food is toxically produced, we can safely reduce our non-combustion emissions of agriculture by 95%. Livestock and their feed comprise 60% of the agricultural land, so we can reduce that carbon by 95% of 60%, or 57%. Also, we're not obese, because we don't overeat, so we can reduce the other agricultural categories by 10%.

- **Fertilizers** – Less than 5% of our food is toxically produced, mainly when we eat out, reducing fertilizers by 95%.

- **Food Processing** – Our processed food is limited mainly to a little bread and pasta, well as vegan cheese, also alcoholic beverages, and comprises at most 20% of our food, so this category is reduced by 80%.

- **Pesticides** – By the same reasoning as our fertilizer reduction, our pesticides are reduced by 95%.

- **Landfills** – Since we send nothing to landfills, instead choosing to compost, this entire category is zero emissions for us, eliminating 0.6% of our CO_2e.

- **Electricity and Natural Gas Transmission** – We can reduce the energy consumption footprint by 10% since we are not part of the Americans who overeat.

Table 6 - Carbon Footprint of Food at the Smith's House

Category	Non-Combustion Emissions	Electricity	Combustion	Transp. On-Site	Land	Transp. Off Site	Total
Agriculture	0.38%	0.33%	0.16%	0.50%	3.4%	0.40%	5.17%
Fertilizers	0.01%	0.004%	0.015%	0.0015%	0.002%	0.001%	0.03%
Food Processing	0	0.12%	0.16%	0.0006%	0.00006%	0.06%	0.34%
Pesticides	0.00015%	0.000015%	0.0003%	$1x10^{-6}$%	$8x10^{-7}$%	0.000025%	0.0005%
Landfills	0	0	0	0	0	0	0
Elect. and Nat. Gas Transmission	0.00027%	0	0	0	0	0.36%	0.36%
Total	0.39%	0.45%	0.34%	0.50%	3.4%	0.82%	5.9%

All in, we've reduced our carbon footprint of food by a total of 14.8%, down to 5.9%, from 20.7% for an average U.S. citizen. Not bad against a goal of 80% reduction. Again, we eat very well, we're healthy, and we probably spend less on our food than average. It can be done and it's not hard. Just think about that. We can actually reduce our carbon footprint almost instantly and probably reverse our disastrous loss of wildlife in short order by simply following decent eating practices that prioritize our quality of life and that of the planet at the same time. While even saying "no" to a significant share of big corp dominance. How can you argue with that?

You can start by simply writing out your own food practices, and chipping away, one meat, dairy, or overprocessed toxic product at a time. You may even be partway there now. And this is just the food. Imagine what we can do when we tackle all the other categories!