

Sustainable Change and the Soil Food Web: An Ethical
Perspective on the Agricultural Industry and the Impacts of
its Science in our Society

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The human race is dependent on food for nourishment, energy and survival. For decades we have farmed the land, unknowing of how we may be harming it in return for all that it gives us.

Sustainable agriculture, like organic farming, is gaining great popularity. It is currently the fastest growing sector of food production in the world (Caron, 2005). The move towards organic agriculture is in response to the risks now understood by scientists, farmers and consumers alike about the detrimental effects of traditional agricultural methods (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001). Organic farming promotes sustainability, food safety and food nutrition (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001). There is much science in organic agriculture (Caron, 2005).

According to the USDA National Organic Standards Board (NOSB) organic agriculture is defined as: “ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001). Organic agriculture is rooted in the principles of minimal use of off-farm inputs and concentrates on management practices that strive to restore, maintain, or enhance ecological harmony (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001; McIntyre, 2003). A primary goal of organic agriculture practice is to optimize the health and productivity of interdependent communities of soil

life, plants, animals and people (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001; McIntyre, 2003).

The objective of this paper is to discuss some of the major implications of irresponsible farming habits and how this science impacts society. I intend to discuss the past, present and future of Canadian farming. I will explore the science of farming, as well as its successor, organic farming. I will also critically evaluate the ethical issues which surround farming, focusing on stewardship of the land and to each other.

The topic of agricultural practices and sustainability involve many communities of people and space. Politicians, farmers, government, consumers and the earth are all involved in this highly charged issue. Each has vested interest, of course given their lifestyle, beliefs and careers more specifically for the people.

The Farmers

The farmers are largely interested in preserving their livelihood. Larger corporations favour lots of nice looking food fast, and primarily deal with only large farms, not family farms. There are little to no benefits for organic farmers. The start-up costs for farmers to convert to organic is usually quite a lot with little subsidy or recognition from the government to help. Some large chain grocery

stores start purchasing from local small organic farms for their organic food line, however, shortly break contract and go with larger farms from the United States.

There are lots of benefits to farmers to make the switch to organic for their practices themselves. For example, many organic potato farmers have little to no disturbance from the vicious potato beetle that plagues non-organic potato farms. Further, the farmers experience seasons of rich, thriving soils that require less remediation and attention. Is it right though, that the farmers who are making the step towards not only food security for many years to come, but take a chunk out of their year's profits to switch to organic farming and receive no compensation from the government? Local, small and big farm farmers have started unions with elected representatives to start lobbying for their rights and voicing their opinions. They are also speaking out against such things as GMO's, BSC wrongful blame, and strategizing how to increase communication with local markets.

The Consumers

Altogether the consumers are a very difficult bunch and we are all a consumer, so we should know. Consumers don't tend to eat food that is strictly in season, we insist on food that "looks good" and we are largely unaware of the harm that we are inflicting. By primarily shopping at large grocery stores we are adding "food miles" to our purchases, not supporting our communities, and likely giving

money to the larger corporations in the United States who are making huge amounts of profit.

The “organic craze” sweeping mildly through Canada, is of no help either. Consumers are purchasing what they think to be organic, yet there is a major issue with regulations for certification. There is no structure to properly certify organic produce/products. In Canada, this is being addressed and guidelines are being drawn up, but not soon enough. Some companies are getting away with being called “organic” but not being completely true in all senses of the definition and its intentions.

The Government

The government really needs to get their act together for a number of reasons. The government is basically the overseeing body of agricultural practices and they have the responsibility of ensuring human health, ecology and the land for generations of present and of future. As mentioned previously, the government is offering no benefit to farmers who go organic. Is this really ethical considering the fact that we are well aware that all soils have an eventual expiry date; we learned this from observation of tropical soils turned to nothing from deforestation. We are also well aware of the time it takes to create soil, tens of thousands of years.

The government places higher taxes on small farms; would it not seem more right to give benefits to farms practicing sustainable agriculture since they are doing less harm to not only the earth but to human health? The government is acting highly ignorant to the pressing issues surrounding agriculture. They are not enforcing sustainable practices though tax benefits or other, they also are not enforcing big grocery companies to be locally supplied. Food miles increase greenhouse gas emissions, export profits to other countries and laden our food with artificial chemical ripeners and preservatives. How come we are not outraged? We, the public have every right to question how our food is produced, where it comes from and what chemicals are involved, yet we do so little to ensure our own health, or the health of our land that needs to produce food for thousands of years to come presumably.

As mentioned throughout this essay, there are numerous ethical implications associated with this issue between the science and society. We must question things like whether our needs are greater than those of the planet. The planet is suffering from our careless agricultural habits, the thriving lands we have now may some day be no longer. Why must we continue farming in such an unsustainable manner; are our needs greater than those of the planet when there are alternatives available? Why are we so slow at realizing that there are benefits to farming practices like organic which tread lightly on the earth? If we don't act now, what will happen? How long will the earth be able to sustain the

way we are farming presently? Should we not avoid the risk and do something now? This is a global issue.

I strongly believe that society has become far too adapted to eating not only too much food, but food that isn't locally grown, because it's not convenient to get, and that we are largely unaware of the future risks we are threatening ourselves with. Out of habit, we also expect to get whatever foods we want at whatever time of the year. People do not eat foods according to the crop seasons because large grocery stores import food from all over the world, adding food miles and greenhouse gasses to our fragile atmosphere.

It is clear that society is highly unaware of the consequences of our actions regarding agriculture. We are stuck in habits, we are not educated about high-risk farming practices, we are not educated about the science of soil systems and chemicals all involved in our food production. Why have we not questioned our responsibilities to future generations? Why have we not weighed out the short-term versus the long-term benefits? And, ultimately, do we not have a stewardship of the land to fulfill as temporary residents of this earth?

The Soil

The bulk of living organisms exist within a few metres of the earth's surface. The role of microorganisms in the earth systems cycling carbon, nitrogen and oxygen

are redefining the role biota play in what is referred to as the “soil food web” (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001). This fragile ecosystem responds harshly to even small changes, particularly to microbial communities (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001). These effects are far-reaching since all of life depends on the food which stems from the earth (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001).

Microorganisms are responsible for the formation of soil, accumulation of organic matter, retention of water, soil structure and clay interaction with compost and agrominerals (Hanna, 1958). Healthy soils will not only grow nutritious food but they have the ability to effectively store excess nutrients and encapsulate potential toxic elements therefore serving the role of protector of the environment (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001).

Mineral change at the surface of the earth is called weathering (Hanna, 1958). The term weathering has a negative connotation of mineral destruction. However, the geologic change associated with weathering to a point is all apart of a nature cycle. The natural change is mitigated by the biosphere is not a destructive force but one of transformation resulting in the proliferation of life on the planet. It is excessive weathering which is spurred by harmful farming practices and misuse of our land which causes greater amounts of weathering that are not associated with natural processes.

The soil from the earth is but a gift to us. It is the source, the place where many food sources grow and mature to sustain life on earth. The health and vitality of our soils directly affect the quality of our water, air and all living organisms. Soil interacts with the many spheres of the planet. It is connected to the hydrosphere, lithosphere and biosphere. The interactions with the spheres allow soil to mature over several thousands of years into a nest where nourishment is born.

Protecting earth's soils should be of utmost importance to all of life's creatures. Current farming practices are not protecting the soil, they are destroying it. One gram of soil can have microbial numbers exceeding one billion and diversity of species in the thousands. For this, and other reasons, soils are very complex micro-ecosystems. The complexity of soil is so great that we barely understand more than 1% of its composition (Caron, 2005). When we understand so little about the soil ecosystem is it really wise for us to be harming it? Even if we understand that we are harming the soil, how much do we truly understand our damages if it is such a complex system? Should we not treat something that we know so little about with more respect since recreating it with the same complexity is ultimately impossible?

Living systems do not only adapt to the environment but shape it to maximize its geochemical potential (Hanna, 1958). This ability of the biosphere to transform minerals to its benefit is beautifully illustrated by soils, but is apart of a very

fragile process (Caron, 2005; Edwards et. al., 1990; Horne & McDermott, 2001). Misuse of farming practices destroys this natural balance. Perhaps visualizing that over 80% of a tree or plant's biomass is found in their roots demonstrates the importance of soil-organism processes. The survival of this web depends on us to maintain its existence. To allow it to continue to give back all that it gives to us. Feed the soil and in turn, it will feed your plants.

Organic farming practices regard soil as the highest of all resources. All the principles of this type of farming are aimed at protecting this most precious and little understood resource. Do we really have the right to be practicing older farming techniques when we have the technology and the awareness of how harmful it is on the fragile ecosystem of the earth? Why are more people not changing over to organic farming practices knowing that if we keep farming with current methods we are going to destroy our once-rich agricultural lands? How can this science be best communicated to promote sustainable change?

Erosion is a common misconception with respect to the science involved in agriculture. Erosion within soil is often highly misunderstood. Erosion, to a point, is good for soils and is apart of their natural cycles and processes. However, erosion is often highly induced by poor farming practices such as crop rotations and monocultures.

Since science is not fixed, it is difficult to communicate; therefore, people oversee the science that is in agriculture. The public gets especially confused with they get the idea in their heads that erosion is a bad thing, but then are told it is a natural thing. The specifics must be properly taught for the science to be fully understood. This whole paper roots back to the question of not only this course, but of this program: "how can the science be effectively communicated so that people understand the issues at hand?" Until that question can be answered effectively, the future of agriculture lies in limbo and the time to do something is now.

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