

*An Update on “The Decline of the Soil and the Land” **

* “The Decline of the Soil and the Land” is an excerpt from *The Gods in Whom They Trusted* (to be published in the fall of 2016)

Last year the United Nations Food and Agriculture Organization (FAO) declared 2015 the “International Year of the Soils” because of the deep concern about the worldwide loss and decline of topsoil. They published an extensive report of over 600 pages written by more than 200 scientists called *The Status of the World’s Soil Resources* (2015), covering various soil and climate regions on each continent. It is the first comprehensive report of its kind. The Intergovernmental Technical Panel on Soils (ITPS) is similar to the Intergovernmental Panel on Climate Change (IPCC). Besides the full report they wrote a *Technical Summary* of 94 pages. Their conclusions are alarming. The evaluation of the condition of the world’s topsoil ranges from *fair*, to *poor*, to *very poor*, depending on the region. There were only a few indications of *good or very good*, and that includes the US and Canada.

A year earlier, in 2013, the United Nations published another report, the *UN Convention to Combat Desertification (UNCCD)*. Their report introduces a new ten year plan for combating drought and desertification on every continent. They highlight the many interrelated factors that affect desertification, such as sustainable development, climate change, biological diversity, water resources, energy sources, food security, and socio-economic issues. Their conclusion is that “desertification can be reversed only if *far-reaching changes* are made in local and international behavior”, and “combating desertification then is really just part of a much broader objective: the sustainable development of countries affected by drought and desertification”. Drought and desertification has become an international issue and will affect all nations. In spite of this global concern, in 2013 Canada withdrew from the convention as the only UN member to do so. The cost of membership to Canada was 350.000 dollars a year, a small price to pay for combating such a global problem.

As the many reports from the early 1980’s on to the present indicate, Canada is not immune to the decline and degradation of its topsoil. The titles of the various studies speak for themselves: *Soils at Risk* (1984), *Land Degradation Issues in Canadian Agriculture* (1990), *Soil: our eroding asset; the vital importance of soil* (2009), *Ongoing Soil Degradation in Canada and its Impact on the Future of Soil Productivity* (2011), and many others (see the bibliography of my main paper on soils). The misuse of fertilizers (calcium, phosphorous and nitrogen) has contributed further to the decline of the land and water. Excess fertilizers and pesticides end up in streams, rivers, the Great Lakes and eventually in the mouth of the St Lawrence adding to the pollution of the water. The number of Beluga whales in the St. Lawrence is declining because of their sensitivity to the increase in pollution as well as a number of other factors. They are like the canaries in the coalmine. The Commissioner of the Environment and Sustainable Development reported in the fall of 2015 that there are approximately 7.000 pest control products in Canada which contain about 600 active ingredients. In his scathing critique he noted that pesticide use is increasing and that little has been done during the last decades to test these chemicals.

“According to Statistics Canada, the area of farmland treated with herbicides, insecticides, and fungicides increased by 3 percent, 42 percent, and 114 percent, respectively, between 2001 and 2011.”

An example from Alberta illustrates how intensely the land and water is used in industrial agriculture and mining. Robert Sanford enumerates what the province produces on about 50 million acres. “Each year Alberta produces up to 2 million head of cattle, 3 million head of swine, 120 million kilograms of poultry, 35 million tonnes of field crops and 25 million cubic meters of timber. In addition, Alberta produces 160 million metres of natural gas, 35 million cubic metres of conventional oil, 80 million cubic metres of bitumen, 35 million tonnes of coal, and between 1,200 and 1,500 petajoules of electricity every year”. The statistics from Saskatchewan and Manitoba do not run far behind. Such intensive use of land, water, fertilizers and pesticides is not ecologically sustainable and drastically changes the water cycle, increase greenhouse gases, and creates more severe droughts, storms and floods.

In 2016 the USDA published an implementation plan and progress report called, *USDA Building Blocks for Climate Smart Agriculture and Forestry*. The report covered all the crucial issues, from improving soil health, better management of the use of nitrogen, reducing methane gas from livestock, conservation of sensitive lands and pasture lands, and stewardship of federal forests. There are many concrete proposals for key actions in every area. Reading the report and case studies one would almost believe that industrial agriculture could become ecologically sustainable and reduce its high impact on global warming and climate change. However the report is written in a political vacuum. It is like a fairy tale. The reality is very different. One only needs to read the article that appeared in Harper’s Magazine (February, 2016), entitled “*The Trouble with Iowa; corn, corruption, and the presidential caucuses*”, to be reminded of the real state of industrial agriculture in the US and the vested interests that resist any structural changes. This does not mean that there are not many good pilot projects, alternative practices and proposals for key actions. On the contrary, but they are voluntary and do not address the various power structures and corporate and financial interests.

These kinds of unsustainable practices are not limited to the US or Canada, they reflect a global problem with chemically-based monocultures and the beef, pork and chicken industries. The report *Agroecology: Key Concepts, Principles and Practices* (2015) summarizes the state of industrial farming well. “There is the paradox of increased food production and growing hunger in the world. The *global food system is broken* as we are destroying the very base of agriculture with unsustainable practices. Conventional agriculture has contributed significantly to the crisis including climate change.” “When we have monocultures, we need to start to apply external inputs and increase management intensity, because monocultures lack biological diversity, which play key ecological roles”. “Unfortunately, 90 per cent of the world’s 1.5 billion hectares under agriculture is dominated by industrial monocultures that are highly dependent on external inputs and energy. The world is largely dependent on only 12 types of grains and 23 species of vegetables. Yet, these monocultures are extremely vulnerable to pests, diseases and climate change.” As a result of the industrialization of agriculture “the number of farms are decreasing while the size of farms is increasing.” “Soil carbon losses are highest on industrial farms and industrial agriculture is a major contributor to climate change, emitting 17-32 per cent of greenhouse

gas emissions in the form of carbon dioxide, methane and nitrous oxide. There are in turn many effects of climate change on agriculture, including the loss of biodiversity and lowered yields”.

The summary goes on to state that “globally, agriculture uses 12 per cent of the land base but 70 per cent of all water withdrawn. We do not have enough water to maintain our current consumption levels; for example, the beef industry uses 15,000 litres of water per kg while cereals use 1,500 litres per kg and fruits, 1,000 litres per kg”. “The bottom line is that industrial agriculture is simply not feeding the world as it was heralded to. To produce only 30 per cent of the food we eat, it uses 70-80 per cent of arable land, 70 per cent of the water, and 80 per cent of the fossil fuel used in agriculture. Industrial agriculture actually produces more biofuels and fodder than food. Meanwhile global hunger is on the rise. Half the world’s population are not fed well; 3.4 billion suffer hunger, malnutrition, and obesity. About 33-40 per cent of the food produced in agroindustrial chains is wasted in production, transport or thrown away. About 40 per cent of our global grain supply feed animals. Hunger is therefore less related to production and more to poverty and inequality. The root cause of hunger, however, is that the food system is controlled by a small group of multinational corporations”. “Both consumers and producers are victims of the globalized food system”.

This brief summary illustrates how much agriculture is in need of a fundamental *structural change* if we are to preserve our global topsoil, stabilize the yearly increase in greenhouse gases and begin to limit climate change and global warming. This radical change is equal to that of what is required by the extraction and burning of fossil fuels. As the great majority of scientists agree we need to leave at least 80 percent of the fossil fuels in the ground and shift to renewable energy within the next decade. The same is true for agriculture, except that it may be harder to imagine that such a radical change is needed. Large-scale industrial agriculture needs to be phased out within the next few decades.

The good news is that there are many ecological sustainable forms of farming being practiced on every continent, including many innovative solutions for rehabilitating and maintaining the soil for every climate and soil region. The main conclusion from the many reports is that the *various forms of agroecology and agro-forestry offer the best solutions for restoring topsoil, preserving water and developing food security*. In a United Nations *Report of the Special Rapporteur on the Right to Food* (2014), Olivier De Schutter strongly recommends that ‘industrial modes of agricultural production’ be shifted to agroecological ways of producing. In a very careful and critical evaluation of *The New Alliance for Food Security and Nutrition in Africa* (2015) he comes to similar conclusions. The UN Conference on Trade and Development in its 2012 report *Wake Up Before It Is Too Late*, calls for “a *fundamental transformation* towards climate-friendly agriculture consisting of a mosaic of *agroecological practices*”. They call for a new paradigm. “The world needs a *paradigm shift* in agricultural development from a ‘green revolution’ to an ‘ecological intensification’ approach.” And *this systemic shift “is much more profound than simply tweaking the existing industrial agricultural system”*.

What is heartwarming is that there are a great number of local and regional ecologically sustainable projects happening in some of the most vulnerable and drought-stricken areas. The hope for the preservation of soil, water and eco systems and as a result hope for reduction of hunger lies with the

millions of smallhold farmers, fishers and foresters. As the IFAD (2013) report, *Smallholders, Food Security, and the Environment* puts it, “current (industrial agricultural) practices are undermining the ecological foundation of the global food system through overuse and the effects of agricultural pollution, thereby enhancing degradation, reducing ecosystem capacity to generate sustainable yields and threatening to negatively impact food security and poverty reductions”. Instead, “with the right conditions, smallholders can be at the forefront of a transformation in world agriculture”, since “smallholders manage over 80 per cent of the world’s estimated 500 million small farms and provide over 80 per cent of the food consumed in a large part of the developing world”. Smallholders depend on “well-functioning ecosystems, including soil fertility, freshwater delivery, pollination and pest control”. For the future of food security the focus and support needs to be on small hold farmers worldwide and phasing out industrial agriculture.

There are a host of reports that support this viewpoint. To give just a small sampling: *International Forum for Agroecology* (2015); *Food Security and Climate Change* (2015); *Water for Food Security and Nutrition* (2015); *Integrated Soil Fertility Management* (2012); *Restoring the Soil: a guide for using green manure/cover crops to improve the food security of smallholder farmers* (2012); *Improving soil fertility with agroforestry* (2009); *The Keepers of Genetic Diversity: meeting with the pastoralist communities in Kenya* (2009); *Why we must invest in local food storage in sub-Saharan Africa* (2015); *The rural Kenyan school that collects water for the community* (2015); *USAID to use permaculture to assist orphaned and vulnerable children* (2012); *Innovations that nourish the planet* (2011), and many other sources. Perhaps one of the most significant study of this year is that by John Reganold and Jonathan Wachter, (2016), *Organic Agriculture in the 21st Century*, which is a review of hundreds of scientific studies of the last 40 years comparing the long-term prospects of organic and conventional farming. Their conclusion is that the many forms of organic agriculture are key to helping feed the world sustainably. In Canada, locally and regionally, we have the benefit of all the work that the National Farmers Union is doing to transform agriculture. Last year they devoted their 2015 conference to “*Soil: our Common Ground*” to develop different policies and practices to preserve and restore topsoil. One of their topics was, “*Acroecology for International Sovereignty: Common Pillars*”.

Meanwhile we can keep buying organic food. The list of locally available organically, ecologically sustainably grown and produced food is impressive and challenges us to step by step change our shopping and eating habits. Moreover, we can all support legislation that protects farmland and makes it easier to pass on farms to the next generation and resist the corporate buying up of farmland. We can also support protecting the Greenbelt, limit suburban sprawl and increase forest areas in Dufferin County. If in 15 or 20 years we are still surrounded in Ontario by monocultures with endless rows of corn, soya, canola, potatoes, etc. then we know that we are heading for an ecological crisis and increased global warming. As a writer in the *Globe and Mail* put it, “The signing of the Paris Climate Agreement, like all agreements before it, could still fail. Meanwhile the planet gets ever warmer. A Pearl Harbor environmental event appears inevitable”. These words echo his 2009 article after the Copenhagen failure, *Climate-change action needs a Pearl Harbor moment*. If that happens, we will know

that we have done what we could and we can hope that the organic growers everywhere will be able to feed our children, grandchildren, and all the children of the world.

Arnold De Graaff, April 30, 2016

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