

Sustainable Agriculture?

By JOHN H. TANTON

The November/December 2004 issue of *Sierra* printed an article titled “Who grows your food?”. The teaser copy on the contents page read “If (the) sustainable farm can’t make it, we’re all in trouble.”

The article was well-written, but did not really deal with the question of sustainability, i.e., whether or not the farm operation yields more energy than it consumes, and whether the energy it consumes is sustainable rather than exhaustible.

To shed some light on this question, I would like to describe my experience as a farm boy, particularly since persons with that perspective are increasingly rare in our society. I hope to also shed some light on what “sustainable” agriculture might look like.

The farm on which I was raised was located in the “Thumb District” of Michigan (Northeast of Bay City), on rich lake bottom soils. The land was “taken up” from the federal government as homestead in the 1870s and 80s by migrants mainly from New York State, chiefly of German stock. To high-

light the evolution of our family farmland, I will present three snapshots, one from 1900, another from 1950, and finally one for 2000.

A 1900 Snapshot

As of 1900, a substantial portion of this 80-acre farm had yet to be cleared from the primeval forest. The farm itself was largely self-reliant and self-sufficient, though crop

yields were low, and did not provide much surplus for the cities. Inputs from the general economy were limited to hardware, steel for the moldboard plow, dynamite for clearing land of stumps, lubricating oils, and some “coal” oil for cooking. The farmhouse was heated with wood, harvested with human and draft animal energy. The farm was solar-powered by hay and

oats growing on about a fifth of the acreage and fed to draft animals. The livestock was a menagerie, with horses, cows, pigs, chickens, goats, turkeys, geese—the latter both tame and wild. The diet was supplemented by local game and fish from Saginaw Bay.

In the winter, the men went ice fishing for weeks at a time, and were visited periodically by the women with sleighs to resupply them with food, and cart the frozen fish off for home-based processing. Refrigeration was by ice blocks cut from the lake in the winter time, transported miles by horse-drawn sleds, and packed into ice houses insulated with sawdust. Human waste was deposited in an



John H. Tanton, a conservationist and long-time activist for the environment and population limits, is the publisher and founder of The Social Contract.

outhouse, which was cleaned several times a year by placing the excrement on the fields, where it was an asset rather than a liability. Virtually no commercial fertilizers or herbicides were used. They did have some pesticides, such as arsenate of lead (bad stuff!) that was sprayed on the apple orchard to control codling moths. The apples were, of course, the source of the all-important hard cider that helped fuel the farm hands. Crops were planted, weeded, and harvested by draft animals and by hand. It was a dawn to dusk operation, seven days a week, 52 weeks out of the year. Beekeeping, orchards, slaughtering, the smoke house, canning, homemade wine, bread, butter, jams, and hired men were all part of the scene.

Moving Ahead to 1950

I was born in Detroit in 1934, and moved in 1945 to the ancestral farm in the “thumb,” on which my mother had been raised. The era of horse power was just coming to an end. Fortunately, our family was able to buy a modest-size tractor, despite the shortages and rationing at the end of World War II. A gasoline tank had been added to the farm’s accoutrements, to fuel this new source of power. Barns were now lighted by electricity, and the cows were milked by electrically powered machines rather than by hand. There was now a market for off-the-farm milk, which was dried to powder at a facility some five miles away. Gasoline-powered trucks arrived several days a week to haul the milk to the factory. Rather than still preserving our own meats on the farm by canning, drying or smoking, we now rented space in the refrigerated “locker” plant in town, where meats were kept frozen. This required a gasoline-powered trip by auto to retrieve them. They were stored back on the farm in an electric-powered refrigerator, and were finally cooked with electricity or propane.



By this time, the native fertility of the soil had begun to sag. There was less manure to return to the soil, because there were fewer horses. Since the classic nutrients of N P and K (nitrogen, phosphorous, and potash) were now shipped off the farm as crops to the city, these now had to be replaced by commercial fertilizers, the production, bagging, and transportation of which required further energy. We still had no herbicides and few pesticides. Weeding was still done by machine and hand. We now required a second small tractor for cultivation (weeding) of row crops. A main cash crop, the sugar beet, was by

1950, beginning to be planted, thinned, cultivated, and harvested mechanically, with gasoline-powered and then diesel-powered tractors. This replaced the exhausting work of 50 years before, when most of this was done by hand. Previously, tons of sugar beets were lifted out of the soil with a horse-drawn plow-like device, had the tops loped off by a very sharp knife, and were then stacked in piles to be insulated against heat spoilage by placing the tops on the piles. Then horse-powered wagons were drawn alongside, the tops were removed, and the beets



were forked up six or eight feet into the wagon. We’re talking tons here, not pounds. These were carted 5 miles or more to the sugar factory by horse, of course, where they were again forked off the wagons by hand. Slow, exhausting work. The tops were fed to livestock. There were not many overweight farmers!

By the 1950s, we had mobile gasoline powered combines to thrash grain in the field. This contrasted with the turn of the century when grain

was cut by hand or perhaps a reaper, assembled into sheaves, and staked to dry. Then they were loaded by hand onto wagons and hauled by horse to a stationary thrashing machine. At mid century, we had manure loaders and spreaders, replacing the human muscle power that discharged this task 50 years be-



fore. Highly soluble fertilizers washed off the land into local water sources, and eventually into Saginaw Bay and on downstream to lakes Huron, St. Clair, Erie, and Ontario.

The farming was still small scale, though yields had increased, and we had more surpluses to send to the cities to support growing urban populations. Much of our food now came not from our own farm or garden, but from the grocery store. In a very real sense, the farmers no longer fed themselves. We had indoor plumbing, which required water, electricity, and a septic tank disposal system, not needed for the outhouse. Owing to all of this mechanization, and the expense of machinery, farms were consolidating and people were leaving the land for the cities.

On To 2000

Consolidation proceeded apace over the last 50 years, and many farmers now operated hundreds, and even thousands of acres, with much fossil-en-

ergy machinery and very little human help. Huge monocultures of crops such as corn encouraged epidemic diseases, which in turn required more and stronger pesticides. Herbicides cut down on cultivation expense, tractors increased in size to eight wheels, with air-conditioned cabs, music, and GPS systems. Yields increased with all of the chemical inputs, but so did expenses and energy requirements. Markets were glutted, undercutting prices, calling the financial viability of these operations into question.

The farm family now obtains almost all of its own food from the grocery store. Food shipped to the cities now ends up as sewage that cannot easily be gotten back onto the land. As a result, the outhouse has been replaced in the cities with sanitary systems that take potable water and degrade it with what should be economically valuable sewage. This must all be gathered in expensive collection systems, pumped to a sewage treatment plant. Much energy and chemicals are then used in an attempt to restore the water to a potable condition and reclaim the sewage for possible use (though by now it is often contaminated by heavy metals and other pollutants from urban waste). The crop farmer now often has no animals on the farm, other than a pet dog or cat, and often has employment only during the active growing season, though admittedly the hours are long at that time.

Synthesis

The food production/waste disposal system has evolved over the past century from one where a significant percentage—perhaps 50 or 60 percent or better—of the population lived on the land and was self-sufficient and self-reliant as to most of its energy needs, food production and preservation, and waste disposal. Nutrients recycled through the farm many times and seldom left the farm for the city, to become a liability. People worked hard, close to the land, and close to forms of life other than the human one. There was no need for exercise gyms and dues!

Fast forward another 50 years to 2050, and we will find virtually all of the population living in urban areas, dependent on others for their most basic

food, clothing, shelter and transportation needs—and even entertainment! These will be supplied by a diminishing corps of farmers, who basically no longer feed themselves. The food supply chain has been expanded to include everyone from coal miners producing the fuel for steel mills that make the steel for the tractors that work the farm, to the oil rig workers in the North Sea producing the petroleum products, to the truck drivers hauling the processed foods around to the various supermarkets. There it is presented in disposable packaging provided by graduates of schools of packing technology. Computer experts provide the management tools, and check-out counter personnel collect money for the food, which is processed through credit cards that provide employment in banks, etc. The whole sewage collection and treatment system must also be cost accounted as part of the cost of the modern food chain. Perhaps we're ahead of the game—if the system can be sustained.

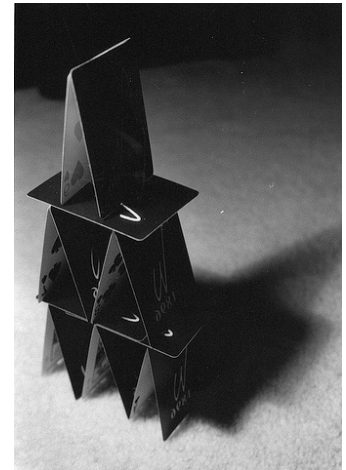
It is often said that American agriculture is a marvel since only two or three percent of the people feed the entire population. As the above view indicates, this is a faulty analysis. A large segment of our population is involved in collecting, processing, packaging, distributing, marketing, disposal of wastes, etc.—all of which were taken care of on the 1900-era farm by its inhabitants. They were indeed self-reliant and nearly self-sufficient.

Now comes the Hubbert's Petroleum Peak. As can be seen, the food chain today is a highly energy intensive one, starting upstream from the farm and flowing on through to the distribution and packaging of food, and its ultimate disposal as a waste product rather than an economic resource. If the energy flow falters, the whole house of cards may well come tumbling down to a considerable degree, depending on the severity of the energy supply problems. The family farm is not sustainable if the outside energy supply is not sustainable.

Whether or not our energy supply is sustainable has been the subject of many articles. At some point, whether sooner or later, our petroleum supplies will begin to run down as to quantity and quality. Consider one example. The United States now burns about 20-plus million barrels of oil day, at 42

gallons per barrel. Such a barrel measures 20 inches in diameter and 30 inches in height. Lined up side by side, 20 million of these barrels would stretch from Seattle to Los Angeles, on to Chicago, down to Miami, up to New York, and over to Cleveland, totaling 6,435 miles. That's how much we burn *each* day. The world as a whole burns about 4 times that amount—82 million barrels a day. Lined up, these barrels would circle the earth at the equator. Does anyone seriously think this can go on forever, or even very much longer?

When the supply begins to run down, we will either have to adjust our per capita standard of living—the multiplicand—downward, or adjust downward the number of per capitas—the multipliers—that enjoy that standard of living. More likely it will take some of both. Need-



less to say, producing quantitatively and qualitatively equivalent amounts of energy from alternative sources will be a project of truly colossal proportions. It must not only be undertaken, but undertaken in time, and it must produce the right kind of energy. Truck freight requires energy-dense liquid fuels; not electricity, the output of most alternative energy systems. The same goes for air transport. We could switch our railroads from diesel to electric, but only at great dollar and energy expense, and the transition would take many years. Energy is key.

My own prognosis for this is all happening, and in time, is so dismal that I won't inflict it upon you. I will, however, end by repeating the teaser copy to the Sierra Club's magazine article: "If their sustainable farm can't make it, we're all in trouble."

We're in big trouble, much more than most people—urban dwellers in particular—realize.

And it is coming sooner than we collectively think. ■