

The recent holiday season was once again a feast of epic proportions; copious amounts of food and drink, endless hours of televised sporting events, and a healthy dose of guilt free marathon mall foraging. For most, the enormous quantities of food are plainly a metaphor for the greater abundances of life, such as career, family and material wealth. It is unlikely that there are many among us who are content to accept that a wealth of nourishment is cause for great celebration, or even that this condition is somewhat of a miracle when viewed against the long historical struggle to feed the world's growing population.

There is certainly an appreciation of "fine" food in America today; it is evident in the selection of outstanding wines available at almost any discount retail store and it is apparent in the many hours of televised cooking lessons that feature celebrity gourmet chefs. The fabulous generation of wealth in America over the past thirty years has created demand for a highly varied diet, and it is not unusual for an American restaurant, or supermarket, to offer New Zealand lamb, Japanese sushi, French foie gras, and Chilean sea bass every day of the year. Even the concept of food seasonality, such as the appearance of fresh, crisp apples in the fall, is an outdated notion, and one that is certain to generate looks of bewilderment if brought up as a topic for discussion in polite company.

The disconnecting of urban America from rural America is a process that has been occurring over the past sixty years; it is largely a process that began in the aftermath of World War Two. During the war, a large industry was developed to produce various nitrate chemicals, which were used in everything from bullets to bombs. After the war, there was a major drive to seek other uses for the industries and infrastructure which were built to support the war effort. The chemical plants that made gunpowder, also known as ammonium nitrate, were converted into fertilizer factories, and soon rural America was awash in low cost plant nutrients. With the improvements in mechanical technology that came from the war efforts and the rapid advances in plant genetics, the stage was set for some stunning advances in efficiency by the American farmer. The result of what is commonly referred to as the "Green Revolution" staggers the imagination; today less than one in two hundred Americans lists his (or her) occupation as "farmer" and agricultural commodities are America's fourth largest export category.

With all the success that has been achieved in the mass production of food, it is easy to see how few Americans would worry about the possibility that our food supply chain has an Achilles heel, or that we were in danger of facing rapidly escalating food costs. Food in recent years has been a non-issue; there is plenty available and relative to other goods and services, it is cheap. But behind the great success story lies a dark, foreboding fact: almost every component of our food production and distribution system is dependent on low cost petroleum. Fertilizer, in the form of ammonia, is made from natural gas; which has recently tripled in price. The various

machines used to plant, till and harvest crops all run on diesel fuel. Pesticides, herbicides and fungicides are almost entirely produced by plants that use petroleum as the primary feedstock. Fresh vegetables and meat are transported to our local markets by diesel fueled trucks, and these products are kept cold in transit by diesel fueled refrigeration units. Much of the water used to irrigate crops today is ground water that needs to be pumped out of the ground by large diesel motors. Our entire food supply chain is critically dependent on petroleum.

Clearly, the current and future population of the world is heavily dependent on a continued supply of low cost petroleum and natural gas. The global population has grown rapidly as the supply of food has increased; this is the expected action in any system that contains living organisms. Increase the food supply and the population will grow. Yet even with all of the great food producing efficiency of the Green Revolution, there are still large numbers of people who are on the cusp of starvation. As the cost of food increases, or as the amount of food produced yearly decreases (because of higher costs), this group of starving, under nourished people will grow.

There are those who question this entire line of thought, and they generally point to the fact that food prices do not seem to be following the same upward trajectory of oil prices. It is instructive to view the costs in our food supply chain as being similar to a freight train at rest; as the engine starts to move, there is a lot of slack in the couplings between cars that must be taken up before the rear car starts to move. For example, farmers generally pay for their next year's fertilizer at harvest time. That would mean that the fertilizer used to produce the 2005 crop was paid for in the fall of 2004, when oil prices were somewhat lower than they are today. And as fertilizer prices rise, farmers will start to put out smaller amounts of fertilizer for each crop. For a few years, unused fertilizer in the soil from previous crops can be utilized by the plants to produce similar yields. But make no mistake, at some near term point, the nutrients in the ground will be insufficient and the yields will go off a cliff.

Already, a large number of American farmers are at a point where they are no longer financially able to farm. Two years of rising input prices have coincided with low commodity prices brought on by the global shift to free, open markets. This synchronization of global commodity prices will produce a one time reduction of some prices in certain markets, but after that, global prices can be expected to move in lock step. The savings brought about by the great global labor arbitrage, whereby the labor rates of Minnesota are replaced by the labor rates of Indonesia, and the resulting savings is passed to the American consumer in the form of lower prices, is truly a one time event. Soon enough, the rising price of oil will be felt throughout the food chain, and owing to the universal pricing of oil, all agricultural producers will be faced with a great margin squeeze.

The first warning flares are being fired off by some of the biggest food processors as this is written. Kraft has just announced that due to 'higher commodity costs' of some \$800 million, they will close 20 plants and lay off 8,000 workers, which is about 8% of their workforce. What boggles the mind is that a large multinational such as Kraft has had a huge impact of lower input costs from their global sourcing capability. But this ability to obtain agricultural inputs at more advantageous pricing cannot offset the huge energy costs that food processors face. Tyson Corporation, which is a large producer of beef and chicken products, has just reported quarterly results that Wall Street analysts have described as a "train wreck". The phrase that keeps re- appearing in their report to shareholders is "higher energy costs".

For the foreseeable future, it appears that energy costs, including crude oil, gasoline, and natural gas will remain at elevated levels, or even possibly rise from the current levels. The time when higher costs can be absorbed by the producers and processors of America's food has passed. Expect to see some hefty increases in the price of food at the consumer level. And also expect that there will be a restructuring of the larger food producers, while many smaller food businesses will cease to exist.