

Are we Outgrowing the Earth?

“What we need to keep in mind is that saving our civilization is not a spectator sport. It is something that we all need to get involved in.” Lester Brown

With the price of oil above \$70 per barrel the race is on to find alternative sources of energy. One alternative that has received much attention is the corn derivative, ethanol. According to BusinessWeek there are now 101 ethanol plants in the US, more than 40 new facilities in the works, and another 100 in the planning stages totaling a \$10.5 billion investment. And while promising, according to Alexander Farrell at the University of California, Berkeley, it would take 85% of the US corn acreage to produce enough ethanol to replace just 10% of the nation's gas demand.

Another challenge in using corn to produce ethanol, is that it will likely reduce the supply available for human and animal consumption. And with grain reserves nearing their lowest level in 34 years, and the possibility that supermarkets and service stations will be competing for the same product, the world may be facing high food and oil prices at the same time. While alarming, as investors it is important to examine such long-term questions because they can spell opportunity. So let's take a look at some of the underlying issues.



Does this look like food or fuel?

In his book titled “Outgrowing the Earth”, Lester Brown, the author and founder of the Washington D.C. based Earth Policy Institute, outlines numerous issues potentially impacting the world's ability to feed itself. Among these are population growth, economic growth, disappearing cropland, water shortages, climate change and food reserves. Below we discuss each of these in turn.

Population Growth: The earth's population is expected to grow by nearly 3 billion people during the first half of this century. While this is less than the 3.5 billion added during the last half of the twentieth century, most of the growth is expected to occur in developing countries in the Indian subcontinent and sub-Saharan Africa. This kind of population growth is likely to place enormous strain on those countries, causing rising tensions between the poor and the wealthy, and between ethnic and religious groups. One problem with an expanding population is that it reduces the area available for producing grain. From 1950 to 2000 the grainland area per person was cut in half, from 0.57 acres to 0.27 acres, making it difficult for farmers to feed the 70 million or more people added each year.

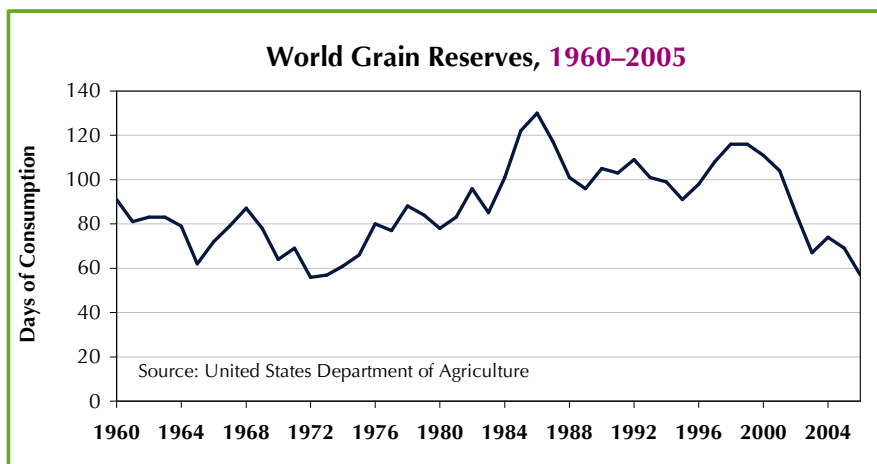
Economic Growth: In countries where people's incomes have risen, so too has their desire for meat, eggs and seafood. In other words, people are moving up the food chain. This improvement in diet might be desirable, but it results in an even greater demand for grains for animal feedstock. China now consumes more meat than the United States and globally the demand for meat is increasing at twice the population growth rate. The higher demand for meat has created a higher demand for animal feed, but it reduces the cropland area used to produce grains for human consumption.

Disappearing Cropland: Brown writes “On April 18, 2001, the western United States – from the Arizona border north to Canada – was blanketed with dust. The dirt came from a huge dust storm that originated in northwestern China and Mongolia on April 5. Measuring up to 1,800 kilometers across when it left

China, the storm carried up to 100 million tons of topsoil, a vital resource that would take centuries to replace through natural processes.” Although soil erosion is not new, the problem begins when soil loss exceeds new soil formation and the inherent fertility of the land begins to fall. In addition to erosion, cropland is being lost to advancing deserts and various non-farm uses such as residential and industrial construction, the paving of roads and parking lots, airports and golf courses. It’s estimated that in the US, every five cars added to the nations “fleet” requires the paving of an area equal to a football field. In the extreme, if China eventually had three cars for every four people as we now do, they would have a fleet of 1.1 billion cars (the current global fleet is 800 million) – that’s equivalent to about 200 million football fields of lost cropland, which equates to 10% of the total land area of China.

Water Shortages: Although public attention has focused on the depletion of oil resources, the depletion of underground water resources may pose a far greater threat to our future. Brown notes that “Not only are there no substitutes for water, but we need vast amounts of it to produce food. At the personal level, we drink four liters of water a day, either directly or indirectly in various beverages. But it takes 2,000 liters of water – 500 times as much – to produce the food we consume each day.” Brown is concerned about falling water tables, as the demand for water exceeds the sustainable yield of aquifers and rivers. Farmers around the world are losing the battle for water to expanding cities. In some countries, like Saudi Arabia and Yemen, falling water tables and the depletion of aquifers have already resulted in a reduction of grain harvested.

Climate Change: If global warming takes hold and the twenty-first century sees average temperatures rise by several degrees, the results could be catastrophic. According to Brown, a team at the International Rice Research Institute concluded that “a one degree Celsius rise in temperature lowers wheat, rice and corn yields by 10 percent.” Even a few heat waves in key growing regions could severely reduce the supply of grains and dramatically reduce the world’s remaining grain reserves.



Food Reserves: According to Brown, “This year’s world grain harvest is projected to fall short of consumption by 61 million tons, marking the sixth time in the last seven years that production has failed to satisfy demand. As a result of these shortfalls, world carryover stocks at the end of this crop year are projected to drop to 57 days of consumption, the shortest buffer since the 56-day-low in 1972 that triggered a doubling of grain prices.” The chart above

shows the reserves of grain worldwide, measured in number of days of consumption. Brown writes, “While terrorism will no doubt remain an important policy issue, the threat posed by food insecurity may dwarf it in terms of the number of lives lost and the extent of economic disruption.”

So what to do? Higher prices for both energy and agricultural products should provide ample incentive for people to develop new technologies to address many of these problems. General Electric, for example, has made significant efforts in wind power, bio-gas engines, and water purification and desalination plants. As investors we should keep our eye out for these types of investment opportunities. For throughout history, humans have shown a remarkable ability to find innovative solutions. We should not underestimate our ingenuity.

“Sometimes when you innovate, you make mistakes. It is best to admit them quickly, and get on with improving your other innovations.” Steve Jobs