A Sustainable Environment: Our Obligation to Protect God's Gift

by
George P. Nassos

Another One Billion People – How Are We Going to Feed Them?

In late October 2011, the population of the earth reached seven billion people, but on top of that, it is continuing to grow at a rate of 10 million people every six weeks. At this rate, we will reach 10 billion people by 2047. Chances are the rate of population growth will slow down, but even if we reach only nine billion people, are we going to be able to feed them?

Although this growth in population will only be an increase of 43% above today's population, it is projected that the food supply will have to double by then. One of the reasons for this large increase is that many more people will have higher incomes, and as a result will eat more, probably more meat. To grow more crops will require more water, but the quantity of available water is decreasing as was described in last month's article (Water – The Need for Better Management of this Valuable Resource). In addition, the water is being contaminated by fertilizers, pesticides and herbicides. Feeding more people would be easier if all of the crops went directly for human consumption. But only 60% of the crops are meant for people, while 35% is used for animal feed. The remaining 5% is going to biofuels, and this portion should not be allowed to increase.

Two months ago, the United Nations released the results of the first ever global study on the state of Earth's land. The primary finding is that 25% of all the land is *highly degraded*, thus making it unsuitable for agriculture. In addition, another 8% is *moderately degraded,* and 36% is *slightly degraded.* Going forward, there are three major challenges: 1) feed all of the current seven billion people (one billion people currently suffer from chronic hunger), 2) double food production in the next 40 years, and 3) achieve both goals while being truly sustainable – meeting the needs for all future generations. An international team of experts headed by Jonathan Foley, University of Minnesota, developed a five-point plan for dealing with this food challenge while maintaining a sustainable environment.

The first recommendation is to reduce the expansion of agriculture land into tropical forests and savannas. Clearing forests for crop land creates a loss in biodiversity and increases carbon dioxide emissions. We should also reduce the use of food crops, such as corn, for biofuels, and if land is available, convert to non-food crops like switchgrass for biofuels.

If we need to double food production without increasing the agricultural footprint, the yields on existing croplands must increase significantly. One approach is to increase the productivity of all the farms including the best farms, thus raising the "yield ceiling". A better option would be to improve the yields of the world's least productive farms, thus closing the "yield gap". The research effort by the team determined that much of the world has a significant yield gap, particularly in Africa, Central America and Eastern Europe. Closing the gap for the world's top 16 crops could increase total food production by 50-60%, with little environmental

damage. In addition to careful use of fertilizers, “reduced tillage” prevents soil erosion, and cover crops planted between food-crop seasons reduce weeds. This technique also adds nutrients and nitrogen to the soil when plowed under, as will leaving crop residues on fields to decompose into nutrients.

Another recommendation is to use resources much more efficiently. This means generating far more crop output per unit of water, fertilizer and energy. Drip irrigation allows the farmer to apply water directly to the plant’s base rather than spraying it over the field. Mulching will reduce water loss from irrigation systems by reducing evaporation. Better application of fertilizer is necessary as many farmers use too much leading to fertilizer pollution, while others apply too little leading to poor crop production. Almost no one uses fertilizers “just right”.

Since it takes 30 pounds of grain to produce one pound of cattle meat, we should shift diets away from meat. Grain-fed poultry and pork is much more efficient than grain-fed beef so even a shift to these foods would be beneficial since our preferences are unlikely to change completely away from beef. This would make more agricultural land available for food crops rather than animal feed.

A final recommendation is probably not much different from what you heard from your parents or grandparents: “don’t leave food on your plate because people in China are starving.” Although this statement is probably no longer true, reducing food waste is important. Roughly 30% of the food produced on the planet is discarded, lost, spoiled or consumed by pests. In rich countries, reducing food waste could be accomplished by reducing oversized portions, food thrown in the garbage.. This will not only trim losses, it would also trim our expanding waistlines. In the poorer countries, the losses are about the same but occur at the producer end in the form of failed crops, stockpiles ruined by pests, or food that is never delivered. These losses can be minimized with improved storage, refrigeration and distribution systems.

None of these recommendations is sufficient to solve the food supply problem. All of them, and perhaps a few more, are critical to feeding the seven to ten billion people during the next 40 years. Perhaps what is needed to make this happen is an incentive system for the farmers and the consumers. Any recommendations?