TOWARD A SUSTAINABLE Future

Adapting to Changes

The real question, for anyone truly concerned about our future, is not whether change is going to come, but whether the shift will be peaceful and orderly or chaotic and violent because we waited too long to being planning for it. – Paul Roberts, *The End of Oil*

It is interesting to note that Pulitzer Prize-winning author Jared Diamond dedicated his recent book, *Collapse: How Societies Choose to Fail or Succeed*, to Montana farmers. In his latest work, he draws some interesting parallels between modern agriculture and the Norse Greenlanders, many of whom starved to death because they insisted on farming the way they always had, despite the fact that everything happening around them suggested that change was imperative.

It is becoming increasingly difficult for us to ignore the fact that we may be entering an era that will force agriculture to change more in the coming decades than it has in the last half century.

The primary driver of this change is likely to be energy. Even major oil companies are now admitting that the days of "easy oil" are over. Whether we have already reached peak global oil production, or will reach it in the next decade, has become a moot point. The fact that world *demand* for oil is skyrocketing precisely when we are reaching peak oil production further intensifies the problem. As a recent Chevron ad put it: "It took us 125 years to use the first trillion barrels of oil. We will use the next trillion in 30."

End of fossil fuel era signals change

Simply stated, the fossil fuel era is over. This is bad news for farmers and will require major changes in our farming practices. The industrial agricultural systems that enabled us to produce unimaginable quantities of monoculture crops and livestock are incredibly energy intensive and depend almost entirely on fossil fuel. This affects farmers who face the increasing cost of diesel fuel, and also rising prices for fertilizers, pesticides, irrigation and farm equipment. As oil and natural gas prices explode due to tightening supplies, costs for all essential farm inputs will spiral upward.

The development of alternative energy supplies will not provide farmers with much relief because no currently available supplies can be harvested anywhere near as efficiently as oil and natural gas were during the last half century. According to Marty Bender of The Land Institute, the United States generated approximately 100 units of energy for every unit of energy that was invested in making oil and natural gas available during the 1940s. A recent report indicates that in Saudi Arabia we are still obtaining more than 200 units of energy for every unit invested. However, current supplies of alternative energy including the much heralded bio-fuels have a far lower investment to return ratio, less than 13 to 1. Corn ethanol seems to hover at less than 2 to 1. The sole exception seems to be wind energy generated with new generation Danish turbines that may have more than a 50 to 1 ratio.

At the same time that we will be forced to shift from energy-intensive to energy-conserving farming systems, other challenges are knocking at the door. Ecological degradation is likely to be a second agent of change. The United Nation's Ecosystem Assessment Synthesis Report warns us that our polluting and over-exploiting ways must change immediately to preservation and restoration if we are to avoid major ecological collapses.

A third driver of change is likely to be an altered climate. Farm publications now are reporting that the often-predicted unstable climate conditions, which result in more varied and violent weather events, already are being experienced on the nation's farms. Volatile climate conditions make highly specialized, monoculture farming less viable than it was during recent decades when we experienced relatively stable global climate conditions.

At the same time that this is happening, income from crop and livestock production fails to cover even the cost of production in most farm communities. Farmers need new markets that will provide them with the income necessary to respond to demands for change.

Change requires fundamental shifts

Such changes will require fundamental shifts in how we do things if we want to maintain at least some quality of life. In agriculture, it likely means a shift from

- energy-intensive to knowledge-intensive farming,
- highly specialized monocultures to more diversified, integrated systems based on biological synergies,
- control management to adaptive management, and
- therapeutic technologies to self-regulating and self-renewing natural systems.

When these basic changes become necessary – in agriculture or any other social system – a few visionaries emerge to show us a different way and generally they are marginalized for doing so. Galileo, Darwin, Einstein, Martin Luther King, Jr. and Wes Jackson are far-sighted figures who come to mind.

Such marginalization occurs as an all-too-familiar pattern while the rest of us try to deny that change is happening or cling to the hope that some new technology will rescue us from the need to change. Martin Luther King, Jr. reminded us that this is not about whether a revolution is taking place, the real problem is that too many of us insist on "sleeping through the revolution."

Unfortunately, the result of such inaction is that change will still come, but as Paul Roberts writes, it is likely to be "chaotic and violent" instead of "peaceful and orderly." Our challenge will be to realize that change is, indeed, coming and to work together to create the new future.