

Dynamic Stability: A Means to No End

by Ralph C. Martin

Agronomists have worked hard to increase the yield of marketable crops. In Ontario, average corn yields quadrupled from about 40 bushels (bu) per acre to about 160 bu/acre, over the last 100 years. In some fields, corn yields are near 300 bu/ac. Although yield plateaus are still unknown, we do know we are getting closer to maximum potential yields.

Interestingly, a new question is emerging. Can we sustain yield stability? In unusually dry years, such as 2012, crop yields were more likely to hold up on dependable land for agriculture, that is class 1 and 2 land, than on less dependable class 3 and 4 land.

Nevertheless, it is often class 1 and 2 land in Ontario that is developed for industry, roads and housing because such dependable agricultural land is located near large population centres. Furthermore, as corn and soybean prices rise, the extra land brought into production for these crops is frequently class 3 and 4 land. Is it a smart long term strategy to pave dependable land and expand cash crop production on undependable land?

Other factors affecting yield stability are crop rotations, the integration of crops and livestock, feeding soil with manure, crop residues and cover crops and selecting appropriate varieties. For example, some crop varieties may result in more moderate and yet reliable yields, across the fluctuations of years. Other race horse varieties tend to maximize yields in good years and are less resilient in bad years. We can choose.

Managing for yield stability offers opportunities to use our resources wisely, with less volatility. Yield stability is within the context of dynamic stability whereby systems are designed to adapt and adjust in preparation for unwelcome surprises. It is not a matter of stalling at stable yields. The trick is to dynamically and deftly adapt to pests, diseases and variable weather. As climate change advances we will need to sustain productivity under temperatures that are too high or too low, at the wrong times, and with too much or too little water, at the wrong times.

Canada, has been blessed with fertile fields, a relatively stable climate, sufficient water supply and good governance. Our inheritance is rich. Other countries manage with much less. It made sense for our pioneering ancestors to emphasize increased production.

Although we still require efficient production, we now have enough information to understand that the emphasis warrants a shift.

Most will agree that we want our descendants to inherit the wealth of productive capacity. The golden eggs, or annual yields, are of enormous benefit to us today. However, the goose laying the golden eggs is productive capacity. The trick is to sustain this goose, through thick and thin. It is reasonable to plan and act for no end to our Canadian food supply.

In society at large, especially since the industrial revolution, we have relied on economic growth in step with population growth to generate prosperity. Growth has been characterized by increasing energy use and material flows and a widening disparity between high and low income earners. At this point in history, our challenge is to sustain human health, meaningful employment, artistic expression, vibrant communities and democracy, with less growth. Just as with crop yields, designing for dynamic stability is prudent.

Ecological models depict some populations of animals that keep growing until they outstrip their resource base and then crash. Other populations of animals gently bob above and below the carrying capacity of their environment, over time. Our human population exponentially expanded over the last century although the growth rate is now slowing. Will we be able to curb numbers and appetites in time to avoid outstripping resources, energy supplies and tolerable levels of pollution?

In some jurisdictions, leaders worry about declining populations and whether fewer taxpaying workers can support an increasing demographic of retired people. A first inclination is to restore population growth and economic growth. However, some hard pressed communities respond by creating resilient ways to live in dynamic stability, with less reliance on growth. In the long run, this approach can be more stimulating, imaginative and practical.

Part of the puzzle is to understand logically and at a deeper level, how much we really need. Why do some have so much and others not enough? Why does each increment of acquisition satisfy less? With respect to food, Canadians on average eat about 20% more than they need and before doing that, waste about 40% of available food. We have wiggle room to adjust.

The push for ongoing population and economic growth, and thus an increasing risk of collapse, could soften. We could shift to dynamic stability as a means to prevent collapse and revitalize.

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