

Slower Yields and Other Benefits of Organic Agriculture

by Ralph C. Martin March, 2017

The review paper (<http://advances.sciencemag.org/content/3/3/e1602638>) by Verena Seufert and Navin Ramankutty of UBC, shows that organic crop yields are 19 to 25% lower than those in non-organic systems.

Carlo Leifert of Newcastle University, in a recent visit to the University of Guelph, noted that organic wheat yields at their Nafferton Farm were beyond the non-organic wheat yields of the 1980s. He suggests that while organic yields may be lower at any given date, they also keep rising. This has been with minimal research support and with more science applied to organic agriculture, scientists and farmers could develop specific varieties and methods to enhance organic yields, as well as attendant ecological benefits.

In one version of Aesop's fable, the hare bounds ahead of the tortoise and then takes a snooze because he is so far ahead. In the end, the persevering tortoise wins the race.

The cost of agricultural intensification over the last 40 years has been a 5 to 7 fold increase in nitrogen, phosphorus and potassium use. The gain has been a 2 fold increase in global food production (<https://doi.org/10.1093/jxb/erm097>). How will energy shortages, declining supplies of mined phosphorus and too much water or too little water, at the wrong time, affect crop yields?

The benefits of organic agriculture (yield tortoise) as cited in the UBC paper, and elsewhere, are that organism abundance is higher (an indicator of greater biodiversity), soil organic carbon is higher (an indicator of soil health), water holding capacity and water infiltration rates are higher (beneficial in times of excess rainfall as well as deficient rainfall), soil erosion is lower, energy use is lower (mostly due to the non-use of nitrogen fertilizer which requires high energy inputs when manufactured), limited phosphorus from mines is lower, pesticide residues in food are lower and antioxidant levels in food are higher.

Regardless of bragging rights for yields, when farmers talk turkey with bankers, it is all about profit. At Washington State University, an 8 hour drive south-east of UBC, the team of Crowder and Reganold published a paper (www.pnas.org/content/112/24/7611) in 2015, to show that profits are 22 to 35% higher on organic farms, when actual organic premiums are applied.

Even with lower yields on organic farms, premiums of 5 to 7% were sufficient to match profits on non-organic farms. Fair prices to farmers help them address ecological impacts.

It is because of the precautionary principle that organic organizations choose to forgo the use of synthetic fertilizers and pesticides and genetically modified organisms (GMOs) and thus accept slower yield gains. The International Federation of Organic Agriculture Movements in the principle of care, states that “organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.”

Some argue that food should be very plentiful so that it is more accessible to low income folks. In Canada, hunger is a poverty problem and not a food sufficiency problem.

Many worry about the urgency to meet the food demand of an expected 9 billion people, in 2050. Less meat consumption could help. The Chinese are proposing a 50% cut to the 63 kilograms of meat per person that have just recently become available, in China.

Even with plenty of food, the Western World, possibly waiting for payment, has stalled on food aid to the 20 million people at risk of famine in Somalia, Yemen, northeast Nigeria and South Sudan. There are poor precedents for allocating excess food to victims of war. Assistance to resolve conflicts (including reconciliation of past and current colonialism) and to improve low-input food production in countries, where inputs are already limited, may be effective long term strategies.

Today Canadians waste 40% of food, along the entire value chain. Let us suppose that agriculture had evolved differently, than it has in the last 70 years and that we produced high quality food, with yields about 25% lower than they are today. Let’s also imagine wasted food at 15%. In a society of 15% wasted food, would we aspire to produce 25% more food so that we could waste 40%?

Non-organic yields have been higher than organic yields and the hare-tortoise race outcome appears to be inevitable. However, we still don’t know. To paraphrase Stuart McLean, “in the organic sector, we may not be fast, but we’re slow.”

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