

**2017 ACORN Conference & Trade Show  
Best Western Glengarry - Truro, NS**

**Workshop Title:** A Regenerative Agroecological System

**Presenter:** André Leu (Australia), Regeneration International

**Executive Summary:** Climate change (“climate disruption”) has proceeded beyond the point where ceasing emissions is enough to solve the problem - we must now work to pull CO<sub>2</sub> out of the atmosphere to attempt to reverse the effects of damaging practises - both in agriculture and daily life. Regenerative agricultural systems can help to reverse the harm cause by traditional practices, and can also solve social and food security issues associated with climate disruption.

André began by expressing how we are blessed to live, work, and farm here in Atlantic Canada!

**\*\*Regenerative, Resilient, Relationship\*\***

“Regenerative organic agriculture improves the resources it uses, rather than destroying or depleting them. It is a holistic systems approach to agriculture that encourages continual on-farm innovation for environmental, social, economic and spiritual wellbeing.” - Robert Rodale termed concept of Regenerative Agriculture: Not only sustain, but improve!!

Climate change - our current situation can be likened to a freight train heading toward a brick wall:

- Even if we cap greenhouse gases (GHGs) today - we will continue to warm 3.5-5C.
- Last year set a record for increase in CO<sub>2</sub> - 3.3ppm.
- The tipping point of 2034 is approaching.
- Adopting renewable energy and stopping emissions will not stop climate change.
- No other time in history has CO<sub>2</sub> risen as dramatically as it has in this decade.

The climate commitment set in Paris in 2015 is rubbish! You can't just plug a leak to stop a sinking boat - you need to bail it out. CO<sub>2</sub> in atmosphere now has a lag effect.

Imagine the energy needed to warm the planet or the oceans by 1C - more extreme and more frequent weather events are an effect of this warming: milder winters with blizzards caused by the excessive energy in weather systems. NASA has reported that “1 in 30 year” events and now 1 in 5. Houston's hurricane Harvey (for example, where over 40” of rain fell over 4 days): “1 in 500 year” event now 1 in 15 years. Caribbean Hurricanes that are “1 in 1000 year” events are now becoming normalized.

350ppm means 2C or more of warming - countries and coastal cities will be under water creating climate change refugees (Bangladesh, Netherlands, New York, New Orleans, Vancouver, Shanghai, etc.).

What does “4 per 1000” mean? Organic farmers have the tools to make a difference: an adjustment from major emitters to major sequestration/sinks for GHGs. Increase soil organic matter by 4 parts per 1000 each year.

The role of economics: worldwide, roughly 200 companies have the majority of the world’s wealth, and with it, so much power, ownership, and control of the world’s economic system.

Paris Agreement reduction effects won’t come into effect until 2030...which is far too late.

### **What could the outcomes be if we changed farming to increase soil organic matter and sequester carbon?**

1ppm = 7.76 Gt CO<sub>2</sub>

We need to remove 15.52 Gt of CO<sub>2</sub>/yr from the atmosphere to stabilize CO<sub>2</sub>: further scaling up to reduce levels even further.

“Regenerative Agriculture” describes numerous systems that regenerate soil organic carbon matter:

- Soil carbon sequestration: Agriculture, Ecosystems & Environment Journal Study - comparative trials - Rodale: manured organic plots sequestered 3596.6 kg/ha/yr. If this data is extrapolated to global adoption, the impact could be 40 Gt/year.
- Regenerative Grazing systems: can sequester more CO<sub>2</sub> than any other system. If these practices were implemented on the world’s grazing lands, they would sequester 98.5 Gt CO<sub>2</sub>/yr.

Food Security in a changing climate: already affected by climate change; extremes will increase.

Europe had a very mild winter with no snow in 2016/17 - plants come out of dormancy in February, but then cold hit again and killed crops, resulting in virtually no fruit crop.

Consider “climate disruption” vs “climate change”.

Water use:

- Organic matter increases infiltration and soil stability. Organic soil maintains structure and integrity: less erosion, better water infiltration (better water efficiency), and higher microbial activity.

- Humus - sponge-like, long chain polymer that can hold up to 30 times its weight in water. It can hold up to a megalitre of water in the root zone (with 6% soil organic matter). Irrigation cannot support all farming systems - we must be able to capture and use rainwater.
- Drought years - organic crops 34% higher yields compared to conventional (Cornell University).

## Agroecological Systems

Problem solving ecologically; “push-pull” systems:

- Compounds in border/adjacent plant species that attract destructive insects species - better results than pesticide sprays have been documented.
- Selective allelopathy (suppression of growth (or germination) of a plant by a toxin released from a nearby plant of the same or another species).
- Eco-function Intensification: import species (plants/insects) that will benefit the system - put other plants in the system that will increase production (Example in Kenya: desmodium used adjacent to corn production, which suppresses weeds, adds nitrogen, conserves soils, repels pests, attracts beneficial predators, provides forage for feed, w/Napier grass as a trap crop that borders corn - attracts stem borer larvae, and has silica hairs that cut like glass).
- Solar-powered pest control with the added bonus of complete soil-coverage.

**When Farmers Innovate:** Adapting systems to peppers, alfalfa, millet, mangoes, etc.

Current drought and wide-spread major social issues are taking a back burner to ‘pop culture’ and sensation (Ex. African drought affecting 30 million people, vs Trump Tweet).

Don’t take away animals/grazing, but change the system to improve the landscape, in turn the system, and in turn food security; add legumes (like faba beans) for food and forage; damn gullies and add ponds; obtain biomass from grasses & manure (for cooking fuel and lighting).

What is the Impact of using compost? (900 samples over 7 years in Ethiopia): significant and reliably better yields (barley, durum wheat maize, teff, faba beans) - 500-800kg/ha improvement.

Implementation of push-pull systems in drought - it has been a good news story for tea growers in Africa.

Don’t rely on governments to improve the system and its outcomes - we the people can make change happen from the ground up.

Q - Desmodium and Napier grasses - are there any native species that can be employed in the Atlantic region?

A - Napier grass is a tropical plants, but there is some desmodium present here; look for sticky or itchy grasses that could have the same effects as trap crops.

Q - Can you comment on the tillage practices for 'conventional' and 'organic' soil comparison examples?

A - Saying that "tillage is the devil" is incorrect; the wrong type of tillage is the devil (ie moldboard plow, too fast, too wet, too dry, all these will destroy soil structure). Open up the soil along its own lines so as not to destroy structure. There are 2 types of organic matter:

- short lived - comes from cellulose - long chains of glucose; needs to cycle to provide nutrients (appropriate tillage can help this cycling) - powers food web to feed cash crop.
- long term (humus) - comes from lignins which allow plants to flex (older plants).
- "no-till" RoundUp-Ready systems don't built up organic matter except in top few inches.