



# PRAIRIE STEWARD

FARMING FOR YOUR FUTURE ENVIRONMENT

The Newsletter of the Saskatchewan Soil Conservation Association    Issue No. 71—Fall 2017



## WHY WE JOINED OPERATION POLLINATOR

*Land use, relationships, new science and more*

As president of the Saskatchewan Soil Conservation Association, Dustin Hannah got a first-hand look at the Operation Pollinator biodiversity program when it was first being talked about. As part of a large family farming operation at Foam Lake, Saskatchewan, he soon made the decision for his family to be involved.

Operation Pollinator is a Syngenta program focused on research and partnerships to promote the health and well-being of bees and other pollinators. Launched in Western Canada's farming community in 2017, participating producers agree to seed plots of up to two acres of usually underutilized or lower productivity land to long-term habitat for wild pollinators.

In return for committing this land to the project, farmers receive high-quality pollinator-friendly wildflower seed for their plots, agronomic advice and some financial support from the program to help offset establishment costs. Operation Pollinator is delivered in partnership with the Soil Conservation Council of Canada which in turn is working with delivery agents in each of the three Prairie Provinces: Saskatchewan Soil Conservation Association, Manitoba Conservation Districts Association and the Alberta Research and Extension Council of Alberta.

The Hannah family seeded three plots in 2017 on different farms among the four family members who own land in the business partnership.

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Dustin Hannah says there are several reasons why they decided to participate.

### **It's good use of land**



“We all have little pieces of land that we try to get into with a drill and can barely turn around. You are overlapping two thirds of the drill coming back out and it really doesn't make money but it's better than leaving as weeds.

“It seemed like a good fit to use some of those areas in a way that promotes conservation, rather than just putting it into crop and not making any money on it.”

### **It's about relationships**

Hannah says his family believes the farming business today is about building relationships. “If you have a relationship where you are both giving and taking, not always just looking for something, it seems to benefit. We do that with our grain buyers, fertilizer suppliers and others.

“So, to be frank, part of our interest in this is having a relationship with companies like Syngenta. You don't know what could develop. It doesn't hurt to do this program, in fact it will benefit. And who knows what other benefits could come out of it.”

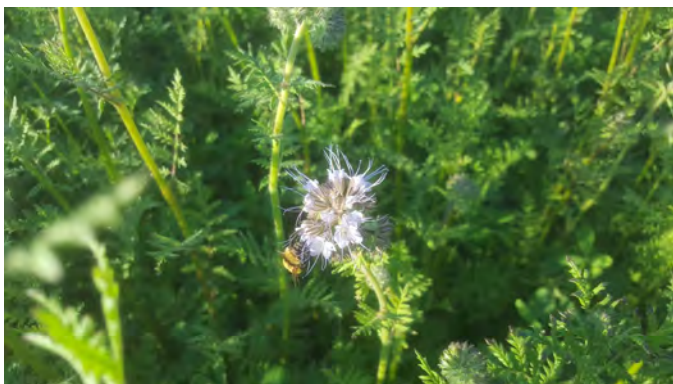
### **It makes sense for industry**

The program also fits with the broader needs of the cropping industry, says Hannah.

There are fewer livestock producers and as farms are being bought there are more of these little areas that are underutilized as equipment gets bigger.

“We could put these into pollination plots. Pollinators can find food and habitat there as well as other wildlife like deer, moose or elk,” he says. “Rather than let them go back to weeds and have seeds blow across your land or float down the ditch to the neighbor's, it is more responsible to seed them down to something like this.”

### **There's potential for new science**



Hannah also thinks it might be possible to learn more about the difference being made in wild pollinator levels.

“I don't know how you do pollinator counts. I'm not a scientist. But perhaps a comparison could be done in a different location near the Operation Pollinator location to see how many pollinators there are on the sites and the general health of them, just to see if we are actually increasing pollinators and giving them a better habitat.

“Then, rather than being just a feel-good story, we can say, yes, we are actually accomplishing something.”

## Simple to participate

Hannah says he's found the Operation Pollinator program very simple to participate in, with registration and seeding both straightforward.

"We went in and did a preseed burn while we were already in the area spraying roundup on canola and then went in later that week with our harrows and a valmar applicator to seed. It was very easy to do."



Phacelia in full bloom at the Operation Pollinator site in August 2017.

### You Can Still Get Involved with Operation Pollinator\*

- Contact SSCA to fill out an enrollment form—email [info@ssca.ca](mailto:info@ssca.ca) or phone 306-371-4213
- Upon approval, next spring you will receive 25 kg of seed (alsike clover, birdsfoot trefoil, phacelia, red clover, timothy, yellow and white sweet clover) at no charge (\$260 value)
- Seed 1 - 2 acres of low productivity agricultural land (low disturbance is recommended)
- Manage and maintain the site as you would any other newly established site
- Restrict grazing on the site for the remainder of the program (2 years)
- Be willing to allow access to the site for monitoring and tours
- Receive \$100/acre seeded (maximum 2 acres) for each of next 2 years (2018 and 2019)

**\* Limited spots left in program—enroll now!**



## INVASIVE PLANTS WORK IN THE WINTER TOO

**Rachel Turnquist, BSA, PAg, Regional Forage Specialist Moose Jaw, SK Ministry of Agriculture**

It is November, and chances are that you have things on your mind other than invasive plant management. However, just because plants are not growing now does not mean that they are not working.



Seed from invasive plants, such as common tansy, can stay attached to the plant throughout winter. Common tansy grows tall, 30 to 180 centimeters, so seed heads can stay well above the snow. The seeds may blow off or be shaken loose by snowmobiles or animals. When the snow melts in the spring time, the invasive plant seed can move with the melting snow. Common tansy originated in Europe and was introduced to North America as a medicinal plant. Over time it has become a serious problem in pastures. It is an aggressive perennial plant that is very competitive with pasture plants. It easily displaces forage grasses reducing the carrying capacity of pastures. Common tansy spreads by both seeds and roots. This invasive plant likes to grow near water which provides it with another way to spread and makes it even more difficult to control. Common tansy is toxic to livestock and people. Cattle will generally avoid it, which also adds to its ability to spread.

Another invasive plant that works in the winter is common burdock. The burs easily attach to cattle and wildlife. Common burdock spreads by seeds. It is a biennial plant that also originated in Europe. In its first year of life it grows into a leafy rosette. In the second year it will grow to a mature plant, set seed and die. Because the plant dies after setting seed and only spreads by seed, best management is to control it before seed set. Common burdock is often found near water in riparian areas. Seeds are easily transported on animals and plants can end up growing on bare ground patches such as around handling facilities. The burs are irritating to livestock as they dig into the animal's coat, can cause facial injuries, and devalue wool.



Absinthe is another tall plant, up to two meters, that can spread seeds in the winter on top of the snow. Seeds can be shaken off the plant by wind or by animals. This perennial weed can produce up to 50,000 seeds per plant and can also spread by creeping roots. Livestock avoid absinthe, giving it an advantage in a pasture. The smell of absinthe is similar to sage. Absinthe thrives in disturbed areas like roadsides and gravel yards and over grazed pastures. Absinthe was introduced from Europe as a medicinal plant. It also has toxic properties.

Some invasive plants work hard at spreading all year long, so we should work to defend against them all year long too. Winter is a good time to read up on identification and management of problem weeds. Many of

the invasive plants in Saskatchewan originated in different parts of the world. They may behave differently here without their natural bio controls. Invasive plants are a threat to our natural ecosystems and a threat to forage resources for livestock. Whether you have invasive plants currently or not, creating an integrated weed management plan is a good practice to manage invasive weeds. Prevention is the best defense.

To learn more about invasive plants or about integrated weed management plans, contact the Agriculture Knowledge Center at 1-866-457-2377.

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## **SOIL CARBON SEQUESTRATION AND THE SSCA**

**John Bennett, producer, former SSCA President**

The SSCA has had a long and active story when it comes to climate change/greenhouse gas activity, starting with the Kyoto negotiations in 1990.

We have constantly promoted the link between soil stewardship and climate change. At an SSCA board meeting in the early 1990's in Kinistino, the subject of carbon sequestration and quantification was discussed. There were soil scientists on the board who, with a few phone calls and a fax machine, came up with a very conservative and easily defensible coefficient for sequestration.

This was used as a justification to lobby the Liberal government of the time to include soil sequestration as an ask in the Kyoto negotiations. Canada pushed for inclusion of soil sinks and at the end was told to choose either forest or soil sinks. Forests were chosen, but "land use, land use change" was included so that changes in farm practices that sequester carbon were possible under the agreement.

With carbon sequestration credits as a possibility, there began a debate as to who would benefit. The SSCA took the position that any value resulting from farmers' actions should return to the farm gate. The counter argument that "farmers are doing this anyway for other reasons, so why should they get paid?" was first used at that time and it continues to be thrown into the debate.

In my time on this file I have seen Agriculture and Agri-Food Canada refer to soil sinks as a "national treasure" which would help address the nation's targets and suggest that by gifting these tonnes to the government, growers would benefit with lower targets. We have also seen various outside groups, ranging from researchers to agronomy information suppliers to input suppliers, suggest that the value of offsets should be credited to them. The "farmers are doing this anyway for other reasons, so why should they get paid?" amended to "farmers should be content with a small percentage of the value created". To counter those arguments, the SSCA played a very important and interesting role as this file matured.

Moving back in time, in 1982 the Manitoba-North Dakota Zero Tillage Farmers Association (ManDak) was the first no-till organization to be established. Some forward-thinking folks in Saskatchewan invited that group to Regina for their annual conference and formed the SSCA after the event. Saskatchewan had the highest adoption rates for no-till in the world in the early nineties, due largely to the SSCA, who provided a forum and support structure for farmers.

Gemco and Trans-Alta Utilities were quick to see the opportunities that carbon credits from soil sinks would offer in a carbon constrained future and approached the SSCA to create the Prairie Soil Carbon Balance (PSCB) Project, which measured carbon change in Saskatchewan soils with zero till management practices. This project has proven very important. Nearly 20 years after it was implemented, this initiative has provided measurements that track sequestration in Saskatchewan soils. It is likely the only large-scale data set that tracks carbon change over long periods of time with field scale plots. We believe the data is a major factor in the quantification of carbon gains in both the federal and provincial carbon sequestration calculations. (To read the 2013 PSCB Project Summary, please go to the SSCA website here: <http://ssca.ca/images/new/PSCB.pdf>)

The SSCA's first move in the effort to return value to the farm gate was to create a consortium with all the soil conservation groups to consult and co-operate with each other before any group signed a commercial soil carbon transaction. The organizations included the Pacific Northwest Direct Seed Association (PNDSA), Manitoba-North Dakota Zero Tillage Farmers Association (ManDak), Alberta Reduced Tillage Linkages (ARTL), and the SSCA. I believe the Soil Conservation Council of Canada and the Innovative Farmers of Ontario were also part of this consortium.

This partnership successfully concluded the first transaction between PNDSA and a utility company in Texas, with the American environmental group "Environmental Defense" brokering the deal. The SSCA signed the first commercial soil carbon deal in Canada called PERRL, which stood for "pilot emission removals, reductions and learnings".

The unique feature of these two deals was that they were storage leases, where growers agreed to store CO<sub>2</sub> emissions for emitters for a specified time. These agreements treated sequestration as a service rather than a commodity.

Then the political climate changed. In the United States, the Democrats lost to the Republicans under George W Bush. Under the Bush administration and the current U.S. administration under Trump, the energy lobby "trumped" (pun intended) the conversation and climate change efforts struggled. Canada elected Steven Harper's Conservatives and the energy sector became much more influential in Canada's climate change "action" plan.

However, as climate change science has progressed, we are now in a new era internationally, with virtually all governments around the globe signing and ratifying the Paris accord. Both the federal government and the Saskatchewan government agree that climate change is real and must be addressed.

There is disagreement on how to move forward. The two options at the moment are a carbon tax or a market type trading system. There are challenges with either option.

The Saskatchewan government opposes a carbon tax. If we are the only province (which seems to be the case) that chooses this path, how do growers deal with the added costs of a tax which would be imbedded in almost all our inputs, from machinery, fuel, chemicals, fertilizer and transportation?

The other option of a trading system has problems as well. There have been and still are several carbon markets. Soil carbon credits were traded on the Chicago Climate Exchange. This was a market set up by emitters, but when it did not get approval from regulators, it failed. There are markets in London and another in Europe, but neither are widely traded and do not appear to have a future. Ontario and Quebec have signed on to the California Climate Exchange. The future of this market is uncertain in the current U.S. political situation. There is litigation by business interests and Trump's administration is openly hostile to its existence. If this market does survive, we need to be aware that soil carbon credits have not been traded.

The SSCA has formed a consortium with virtually all Saskatchewan commodity groups, as well as APAS and SARM, to present a common position and to be neutral in the carbon tax - carbon market debate, since there are problems at the farm gate with either option. There has been some discussion on a "blended" option, but it is important to approach the issue from a pragmatic perspective and an understanding of the rules as they develop.

Soon after this is published in the "Prairie Steward", the province will put forward its plan to address climate change and the conversation might become a bit clearer. Whatever the outcome is, the SSCA can take considerable satisfaction in the effort and intellect invested in moving this forward. Our efforts have always been to return value to the farmers we represent.

As the author of this article, I have deliberately chosen not to name the many dedicated, intelligent and committed SSCA board members and staff that have put so much effort into this issue.

Hopefully there will be a successful outcome to reward this effort. Regardless, the SSCA can be proud of its efforts on behalf of Saskatchewan growers.



# Saskatchewan Soil Conservation Association Inc.

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## **EXECUTIVE SUMMARY – SOIL CARBON POSITION PAPER (Version 1) Carbon Advisory Committee – August 2017**

- Saskatchewan growers, using no-till or zero-till seeding, are sequestering 9.64 million new tonnes of CO<sub>2</sub> every year on nearly 28 million acres of farmland. That is the equivalent of taking over 2 million cars off the road. The figures come from the Prairie Soil Carbon Balance (PSCB) Project – a collaboration of the Saskatchewan Soil Conservation Association and soil scientists with Agriculture and Agri-Food Canada to determine real soil carbon sequestration rates – that analyzed thousands of samples, taken at intervals over a 15-year period, from farms in all soil zones across Saskatchewan’s grain growing regions.
- The credibility of any climate change plan and its components will always depend on the quality of the science that has been incorporated into that plan. It is important to continue to develop the science by sampling the remaining farms on the original PSCB Project. It is also important to develop a PSCB Project II to provide a more sophisticated analysis about what causes soil carbon sequestration and to develop a dynamic coefficient that will deal with ongoing controversy about when or if prairie soils may reach a saturation level.
- The international climate agreements that Canada has signed, including the Rio Convention and the Paris Agreement, place a significant focus on the importance of anthropogenic sinks (such as soil carbon sinks) in achieving long term goals for emission reduction. It is important that Canada now place a high priority in establishing pan-Canadian protocols that meet international best practices and accounting standards for verification of carbon credits.
- The impact of carbon pricing on agricultural inputs and costs is a serious concern to farmers. The work to create a framework that would allow a consistent determination of the actual cost of carbon pricing for all farm inputs and costs for the wide variety of production across Canada, is a very complex project and will require a strong partnership between farmers and the federal government. We believe the Grains Roundtable process which includes producers, federal and provincial governments, and the supply chain, and which is already in place to advance agricultural issues, is the ideal forum to oversee the development of that methodology.
- It is essential that Canada’s climate change plan includes an export sensitivity process to understand and calculate the impact of carbon pricing on the competitiveness of Canadian exports, including agricultural exports, and to discuss whether mitigation policies are needed to support disadvantaged export sectors.
- The administration of any soil carbon removal credits must include grower ownership, a registry that allows growers to ‘bank’ their credits, an effective price discovery mechanism and full transparency of basis costs.
- The Carbon Advisory Committee and Support Groups are not advocating for either a carbon tax or a carbon trading system. We want to ensure that soil carbon sequestration is fully recognized and rewarded for its contribution to achieving climate change goals. Our fundamental premise in the discussion about soil carbon credits is that if emitters are penalized through the imposition of a carbon tax on pollution or emission reduction limits, it is reasonable that those who are removing GHGs, through carbon sequestration or capture, should be compensated in equal measure.



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**SOIL CARBON POSITION PAPER (Version 1)  
Carbon Advisory Committee – August 2017**

The preliminary and very conservative science for soil carbon removals has clearly demonstrated how important the soil sink in Saskatchewan is in the effort of climate change planning to meet emission reduction goals.

The Paris Agreement recognizes the critical need to “conserve and enhance” these kinds of anthropogenic removals and sinks. The focus of the Carbon Advisory Committee is to ensure the acknowledgement of this priority as the Canadian Climate Change Plan is developed and the planning for its administration begins. The maintenance of existing sinks is equally as important as the effort to continue building them.

**Position Statement of the SSCA Carbon Advisory Committee and Support Groups:**

**If emitters of GHGs are penalized through the imposition of a carbon tax on pollution or emission reduction limits, it is reasonable that those who are removing GHGs, through carbon sequestration or capture, should be compensated in equal measure.**

**The Importance of Science**

The credibility of any climate change plan and its components will always depend on the quality of the science that has been incorporated into that plan.

The need for objective scientific research has long been recognized in Saskatchewan with the Prairie Soil Carbon Balance (PSCB) Project, which was the result of the partnership and international leadership of the Saskatchewan Soil Conservation Association (SSCA) and the soil scientists with Agriculture and Agri-Food Canada (AAFC) initiated in the early 1990s.

Much of the initial scientific thinking about soil sequestration of CO<sub>2</sub> was based on small plot research and incorporated into soil system computer models, the most notable one being the Century Model. The PSCB Project was initiated to move the science from small plots to the field scale and remains the only significant long term soil sequestration research under commercial growing conditions.

The PSCB Project has established that 0.38 tons of CO<sub>2</sub> per acre is being sequestered every year by Saskatchewan growers using no-till or zero-till seeding. That result is the average of the scientific analysis of thousands of samples taken in 1996, 1999, 2005 and 2011 from all of the soil zones across the Saskatchewan grain growing regions.



That means an average of 9.64 million new tonnes of CO<sub>2</sub> being sequestered each and every year in Saskatchewan soil is the result of 27,964,691 acres (2016 Census) of no-till or zero-till crop management in this province.

The 9.64 million tonnes of CO<sub>2</sub> being sequestered is the equivalent of 2.02 million cars being taken off the road (more than two and a half times the number of light motor vehicles registered in all of Saskatchewan in 2016).

An early assumption made in the Century Model was that carbon sequestration into the soil under no-till or zero-till seeding would peak after a period of 20 to 30 years and would then decline over time until the soil reached a point of saturation and would no longer sequester CO<sub>2</sub>. The PSCB Project and other research in Saskatchewan have raised questions about these early assumptions because the sequestration is going deeper into the prairie soil than initially believed and the sequestration rates are continuing at a higher level longer than expected.

We also recognize that the science of climate change is relatively young and that significant ongoing research is required. Formal processes within climate change planning should be implemented to identify the specific areas of research that are required in the short and medium term and to confirm priorities. All research must be in partnership with, or authorized by, the federal government. It is also very important for producer groups to participate in the funding and administration of these research projects, first to ensure farm priorities are maintained, but more importantly to ensure that producers have full future access to all the data and the scientific direction emerging from the research.

#### **Position Statement of the SSCA Carbon Advisory Committee and Support Groups:**

**In our discussions, we have identified some important scientific research items that should be given priority for funding:**

- 1. To continue the sampling and analysis of the remaining sites of the Prairie Soil Carbon Balance Project to enhance the scientific understanding of long term zero till on sequestration rates and to clarify the issue of soil saturation by carbon sequestration.**
- 2. Recognizing the dwindling number of sites available under the original PSCB Project, to implement a PSCB Project II to build on the current scientific knowledge and to ensure an even longer term evaluation that will consolidate the confidence in the data that would be the basis of a soil carbon offset trading or carbon removal system.**
- 3. To determine the management practices that will maximize carbon sequestration in hay and pasture land and the annual sequestration rates for different soil types and under various weather conditions for forage lands.**
- 4. To better understand how much carbon is emitted back into the atmosphere when some tillage is required on fields that have been zero-tilled for many years or decades.**
- 5. To focus the research on nitrous oxide emissions in a manner that ensures effective use of fertilizer to maintain production with minimized emissions.**

Creation of a Dynamic Annual Sequestration Coefficient:

The annual sequestration coefficient of 0.38 tons of CO<sub>2</sub> per acre from the PSCB Project was established by averaging four large annual data sets containing thousands of samples. The research being advocated above will allow consideration for the establishment of a rolling annual sequestration coefficient that will use the most current annual data sets on into the future. This dynamic coefficient approach will also resolve the debate over saturation because it will identify any decline and levelling of sequestration rates if or when that actually occurs.

Any proposal for a soil carbon credit trading system that incorporates an artificial baseline will be a significant administrative challenge. A scientifically-based dynamic coefficient will allow all the new carbon sequestration each and every year to be made available to assist in the achievement of climate change goals.

### **The Role of Soil Sinks in Addressing Climate Change**

The United Nations Framework Convention on Climate Change (UNFCCC, also known as the 'Convention' or the 'Rio Convention'), the Kyoto Protocol, and the Paris Agreement place a significant emphasis on anthropogenic sinks and the need to maintain and increase these sinks if a long-term solution to climate change is to be found. For example (from a number of different references to sinks in the Paris Agreement):

*Parties strive to include all categories of anthropogenic emissions or removals in their nationally determined contributions and once a source, sink or activity is included, continue to include it*

*Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1d, of the Convention, including forests*

We also note a statement in the Vancouver Declaration of March 3, 2016, that was issued after the First Ministers Meeting on Clean Growth and Climate Change. All provinces and the federal government agreed to:

***Work together** to enhance carbon sinks, including in agriculture and forestry, taking into account international best practices and accounting standards, to recognize their contribution to mitigating GHG emissions, and toward the establishment of a pan-Canadian offset protocols framework and verified carbon credits that can be traded internationally.*

### **Position Statement of the SSCA Carbon Advisory Committee and Support Groups:**

**We urge the federal and provincial governments to make the Vancouver Declaration commitment to enhance carbon sinks an immediate priority. The establishment of a pan-Canadian protocols framework would allow verified carbon credits (including soil carbon removals) to be traded internationally by taking into account international best practices and accounting standards.**

It should be noted that the Government of Saskatchewan has made this request to the federal government in its 'Climate Change White Paper' released by Premier Wall on October 18, 2016.

Federal agriculture officials seem to be taking a position that each provincial government should be responsible for establishing protocols for carbon trading despite the wording they signed in the Vancouver Declaration. If that is the federal position, possibly because of their policy for each province to establish their own climate change plan, it is simply unworkable. You cannot have a country with half a dozen different standards and protocols for the same carbon credit.

### **The Impact of Carbon Pricing on Agricultural Inputs**

In an energy-intensive industry, the impact of carbon pricing on agricultural inputs and costs is a very serious concern.

Any process to assess the impact of carbon pricing on the emissions from agricultural inputs and costs must be authorized and have the technical approval of the federal officials responsible for managing the climate change plan. Much of the critical data for such a process is only available from federal scientists and data collections. The process will also require the participation of provincial governments and commodity associations. It is essential that all farm inputs and costs are considered, not just fuel alone.

#### **Position Statement of the SSCA Carbon Advisory Committee and Support Groups:**

**The work to create a framework or template that would allow a consistent and accurate determination of the actual cost of a carbon pricing regime for all farm inputs and costs, for each of the many crops grown under different conditions across Canada, will require a strong partnership between the federal government and farmers. We believe that the farmer, federal, provincial, supply chain forum established in the Grains Roundtable process is the ideal place for that work to occur.**

The analysis required to determine the impact of carbon pricing on agricultural inputs and costs for growers and the supply chain is a very complex exercise.

We view this kind of impact analysis as being fundamentally different from the soil carbon and sequestration analysis on both the technical and policy levels. Any suggestion to combine all the diverse aspects of the two different sets of analysis into a “whole farm” or some kind of emission/removal comparison will unnecessarily complicate and delay the scientific research and the policy development process.

An example of this distracting approach is a ‘zero emission’ concept for the agricultural sector proposed by the fertilizer industry in a recent set of open houses. But we feel strongly that the fertilizer industry needs to focus on research to reduce the carbon use in production and to find the most efficient application technology and fertilizer formulations to reduce emissions from the field.

#### **Carbon Intensity Emissions:**

If Canada and the rest of world continue to implement an aggressive carbon pricing strategy, the agricultural sector should encourage a serious focus on reducing its carbon intensity per unit of production. This strategic approach will make an important contribution to emission reductions and will give Saskatchewan farmers a significant competitive advantage because of their historically frugal approach to input use.

## **Export Implications**

Climate change planning processes since the signing of the UNFCCC have almost universally understood the principle that exported products require a process to recognize and compensate those products which are sold in competition with jurisdictions that do not have a climate change plan with carbon pricing. If that situation is not taken into account, those exported products could potentially experience significant loss of market opportunities and revenue.

Agricultural production in Saskatchewan is energy intensive and will be significantly affected by any kind of carbon pricing mechanism. Most of its production is exported and so would be extremely vulnerable if other competing agricultural jurisdictions do not have a carbon price on the emissions from their farm inputs and costs.

### **Position Statement of the SSCA Carbon Advisory Committee and Support Groups:**

**It is essential that Canada's climate change plan includes an export sensitivity process to understand and calculate the impact of carbon pricing on the competitiveness of Canadian exports.**

## **Administration of a Soil Carbon Credit**

No matter what system is finally chosen to implement carbon pricing and to recognize soil carbon removals, a rigorous and transparent administrative process will be required to identify, quantify and verify the actual amount of sequestration for each individual grower. It must incorporate the most current science and be fully accepted by international regulators.

Grower ownership of the soil carbon credit, and the option to 'bank' that carbon credit for sale at some future date, are the two critical elements necessary to ensure a fair return to farmers.

We propose that a Soil Carbon Registry/Bank, for growers to register and to hold their carbon credits until they are sold, is an essential component of climate change administration. One option that needs to be explored in Saskatchewan is a partnership between producers and the Saskatchewan Crop Insurance Corporation (SCIC). Saskatchewan growers will own the majority of the soil carbon credits created in Canada and have a long history of involvement in the research and policy development for soil carbon. SCIC has experience with soil carbon credits and a long working relationship with producers which make it a natural partner in the development of this model.

The Soil Carbon Registry/Bank should be a self-financing, fee-for-service entity, with no cost to government over the long term. The administration needs to be as simple and transparent as possible which will benefit both growers and the administrators. It is essential that it also includes an effective price discovery mechanism and a full disclosure of basis costs to ensure a fair return to producers.

The Alberta carbon offset trading experience, which requires the use of aggregators for the sale of soil carbon credits, is a clear illustration of a system that does not provide a fair return to producers. It is clearly designed to transfer value to the aggregators that minimize the return to growers. There is no price discovery mechanism and no way to evaluate basis costs. The grower does not have ownership and in fact only aggregators can create and sell the carbon credit. It includes a significant retroactivity provision to encourage participation in the program. Retroactivity so seriously complicates the administration and verification of the

offsets that it only reduces the credibility and the value of the offset (and has been a serious target of the Alberta Auditor General). The Carbon Advisory Committee opposes any attempt to adopt a system that mimics the Alberta soil carbon administration or protocol.

### **Position Statement of the SSCA Carbon Advisory Committee and Support Groups:**

**It is important to note that the SSCA Carbon Advisory Committee and Support Groups are not advocating for either a carbon tax or a carbon trading system. The explicit priority that the United Nations places on the conservation and enhancement of anthropogenic sinks, including agriculture and forests, provide many different options to achieve that goal for sinks.**

### **The Rationale for Grower Participation with Soil Carbon Removals**

We recognize that there are arguments against soil carbon payments to growers that need to be addressed.

A comment that is often heard is that “farmers would be doing direct seeding anyway, why should they get paid for it?” The fact is that grain growers are business operators facing significant risk and highly variable income each and every year. As such, growers need to be developing every possible revenue source from their farming activities, including payment for soil carbon sequestration.

Another frequently raised criticism of soil carbon payment for direct seeding is the ‘business-as-usual’ (BAU) argument which says that any practice that involves well-established and widely-used technology is not creating ‘new’ sequestration to meet emission reduction goals and is therefore not eligible as a carbon credit. The BAU terminology is not part of any of the text of the UNFCCC, the Kyoto Agreement, or the Paris Agreement. It appears to have originated early in the climate change discussion by environmental activists who opposed the concept of offset systems because they thought it was just an excuse for large emitters to avoid making changes. It has also been observed that many who make the BAU argument do not understand that direct seeding is creating new sequestration each and every year.

Another issue similar to the BAU concept is the administrative ‘additionality’ process of creating artificial baselines and decreeing that only sequestration after that date can be eligible as ‘new’ removals for climate change accounting. This process may or may not be useful for fixed point pollution or large industrial emitters but is becoming clear that it is unworkable in the dynamic environment of sinks with tens of thousands of players over a broad landscape. The complexity that would be involved in trying to apply this approach would be an administrative nightmare.

The bottom line in all of this is that climate change administrators, as directed by the Paris Agreement, must recognize that anthropogenic sinks may well need to be treated differently.

But the essence of the rationale for the recognition of grower contribution by soil carbon removal in climate change plans is reflected in our fundamental position that if the government is going to penalize carbon emitters through carbon pricing regulations, then it is only fair to ensure that those who are removing greenhouse gases should be compensated in equal measure. And finally, while it is more than easy to get caught up in the complexity of regulation creation, the real and most important question should always be how the CO<sub>2</sub> in the atmosphere is actually being affected. The sheer size of the soil sequestration occurring in Saskatchewan is an important, maybe even critical, asset in meeting our climate change goals.



**ORGANIZATIONS SUPPORTING THIS  
SSCA CARBON ADVISORY COMMITTEE  
POSITION PAPER**

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- Saskatchewan Barley Development Commission
- Saskatchewan Canola Development Commission
- Saskatchewan Flax Development Commission
- Saskatchewan Oat Development Commission
- Saskatchewan Pulse Growers
- Saskatchewan Wheat Development Commission
- Agricultural Producers Association of Saskatchewan
- Saskatchewan Association of Rural Municipalities
- Soil Conservation Council of Canada



### **SSCA STUDENT MEMBERSHIP**

The SSCA now offers a “Student Membership” for a fee of just \$10 to encourage students to learn about our organization and its role in Saskatchewan’s history of soil conservation, and perhaps to contribute to its future goals. This membership is available to students at either undergraduate or graduate levels, and also allows them to attend the annual SSCA conference for the membership price offered to all SSCA members.

If you know any students who may be interested in this offer, please direct them to the Student Membership Form under “What’s New” on our website at [http://ssca.ca/images/pdf/Student\\_Membership\\_Form.pdf](http://ssca.ca/images/pdf/Student_Membership_Form.pdf).



## SOIL CONSERVATION COUNCIL OF CANADA UPDATE

**Tim Nerbas, PAg, SCCC Vice Chair**



The Soil Conservation Council of Canada (SCCC) is the voice for Soil Conservation across Canada. We have had a busy 2017 and look for continued discussions and partnerships going forward. Soil health is important for everyone.

In April we focused on promoting National Soil Conservation Week (NSCW) from the 17th to 22nd. It is an annual opportunity for SCCC to remind all Canadians about the importance of soil health and soil conservation. As the face and voice of soil conservation in Canada, every year we look forward to getting our message out on the importance of soil care out to the public.

We used NSCW as a platform to launch the national “Soil Your Undies” (SYU) Campaign, in cooperation with the Innovative Farmers of Ontario and sponsor Stanfield’s. The campaign encouraged citizens across the country to take part in a fun and informative demonstration of soil health. We released a video featuring the burial of plain white cotton underwear at the AAFC Central Experimental Farm. In July, we recorded the recovery of the same cotton underwear and examined the state of decomposition. In this case, more is better, that is, a high level of decomposition indicated a healthy and biologically active soil. The great thing about the SYU campaign was that anyone with a patch of soil to care for, whether it’s a farm, a vegetable garden or a flower bed took part. SCCC was very busy with radio and TV interviews during this promotion. We plan to repeat and exceed the success of this campaign in 2018.

In April we also launched Operation Pollinator. This program focused on research and partnerships to promote the health and well-being of bees and other pollinators. The program promotes biodiversity, habitat development and other practical initiatives that contribute to healthy pollinator populations. The SSCA joined SCCC and Syngenta to act as a provincial delivery agent for this initiative. The program was also launched in Alberta and Manitoba. Contact SSCA if you are interested in the program.

In July, I attended the Soil Health Institute’s (SHI) 2<sup>nd</sup> annual meeting in St Louis, Missouri. This conference discussed how to implement an action plan for soil health and was a kickoff for this same plan. You can visit the [www.soilhealthinstitute.org](http://www.soilhealthinstitute.org) website for full details of the action plan. The SHI is a non-profit organization charged with coordinating and supporting soil stewardship and advancing soil health. We look to continue our relationship with this organization who shares a similar vision to our own. The SHI mission is to “safeguard and enhance the vitality and productivity of soil through scientific research and advancement”.

In August the SCCC hosted the 2<sup>nd</sup> Summit on Canadian Soil Health in Guelph, Ontario. The Soil Summit 2017 brought together farmers, the agricultural industry, extension experts, scientists and policy influencers to share knowledge and expertise on this important issue. We are developing a white paper to identify opportunities to overcome soil degradation and improve soil health so food production can be more secure. Determining the technological gaps is vital to identify research priorities. Highlighting the importance of soil health for everyone in Canada continues to be a priority for the SCCC.

In November we will be appearing before the Standing Committee on Agriculture. We have been asked to discuss soil conservation and the impacts of climate change on agriculture.

## 2017 SSCA BOARD OF DIRECTORS

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## 2017 SSCA CONFERENCE SPONSOR ACKNOWLEDGEMENT

We would like to acknowledge and thank our 2017 Conference Platinum Sponsor, SaskCanola, without whose support the SSCA would not be able to host this valuable event.



[www.ssca.ca](http://www.ssca.ca)

[www.prairiesoilsandcrops.ca](http://www.prairiesoilsandcrops.ca)

[www.reducedtillage.ca](http://www.reducedtillage.ca)

**SSCA's mission is "to promote conservation agriculture systems that improve the land and environment for future generations."**

**SSCA's vision is "to be the recognized driver and facilitator of change that leads to conservation agriculture being practiced on prairie agriculture land."**

**Disclaimer: The opinions of the authors do not necessarily reflect the position of the Saskatchewan Soil Conservation Association.**





## THE HEALTH OF SOILS: SASKATCHEWAN

Joanne Kowalski, PAg, Ministry of Agriculture

The International Year of Soils (IYS) was declared for 2015 by the General Assembly of the United Nations through the Food and Agriculture Organization (FAO). The FAO statement on soils said in part that “Soils have been neglected for too long.” But is this true for Saskatchewan? In a presentation on World Soil Day 2014, Dr. Rigas Karamanos discussed the impact of changes on soils in western Canada and made the distinction between soil health and soil quality. The two are not synonymous.

So, what is soil health? In essence, soil health *measures a wide spectrum of perceptions about the “fitness” of the soil to be a desired medium for the activities of the varying objectives of groups of people.* Determining soil health is both a scientific and socioeconomic exercise as fitness of a soil can mean something different to different groups, e.g., soil fitness means something different to a farmer than to a regulator than to a member of the public.

As for soil quality, there are two components: inherent and dynamic. An Inherent soil quality is static over time, such as parent material, topography, mineral content and soil texture. Farming practices that cause losses due to soil erosion can result in the reduction of a soil’s quality.

Dynamic soil quality refers to the properties of soil that can change over the short term such as microbial biomass, nutrient status and nutrient mineralization rates. Again, some farming practices can result in changes that can occur over the growing season or even over hours or days.

Nonetheless, there are farming practices that have a positive outcome on the health of a soil, that can prevent soil degradation and in some instances reverse negative effects. Some examples include:

- Introduction of zero-till and direct seeding. A recent study by Dr. Richard Gray at the University of Saskatchewan shows that onsite, long run benefits of the adoption of zero tillage since 1985 is worth a touch over \$9 billion. These benefits were identified as reduced wind erosion and soil salinity and increased soil organic matter, soil organic carbon and the resulting increase in production or soil quality.
- Elimination of summerfallow. The huge reduction in summerfallow acres has followed the same trend, and Gray’s study shows that the onsite short run benefits are worth a touch under \$9 billion. These benefits would include cost reductions for machinery, labour, fuel and other inputs as well as increased production.
- Adoption of proper crop rotations. Crop rotations in continuous cropping systems that utilize nitrogen fixing crops and perennial cover can have positive effects on soil quality through the addition of nutrients and organic matter, regulation of pH and salinity and improvement in nutrient holding capacity.

Onsite benefits that can accrue to soil health from practicing conservation tillage, zero-tillage and direct seeding include the increase in soil organic carbon (SOC). Increased SOC is related to improvements in soil structure, inherent soil fertility and nutrient cycling, enhanced water and air movement and an expanding diversity of the soil microorganism community. The sequestration of SOC in the soil lowers the release of carbon dioxide (CO<sub>2</sub>) in turn lowering greenhouse gas emissions. When crop residue is left on the soil surface, further onsite benefits involve improved air quality from reduced wind erosion and fewer field operations, improved soil tilth improved moisture holding capacity, enhanced nutrient retention and reduced run-off.

So, in Saskatchewan: have our soils been neglected and are our farming practices sustainable? The definition of sustainable management is open for discussion but it's true that the wide-spread adoption of the conservation practice of zero-tillage has benefited Saskatchewan farmers both economically and environmentally over the long term. A negative aspect of modern production is that it does rely on nonrenewable energy consumption in both the production of inputs (e.g., fertilizers and pesticides) and in fuel for field operations. These concerns are important especially when combined with the issues related to managing the risks of climate and markets.

In Gray's study, some offsite benefits from zero-tillage practices are also counted, including reduced carbon dioxide emissions through soil carbon sequestration and fuel use reduction and reduced nitrous oxide release. In total, the onsite and offsite benefits add up to \$18.7 billion.

The main concerns of agricultural sustainability in the 1997 article by Carter et al. *Concepts of soil quality and their significance* were:

- maintaining or improving farm productivity,
- avoiding or minimizing adverse impacts on natural resources and associated ecosystems,
- maximizing the net social benefit derived from agriculture, and
- promoting flexibility of farming systems.

In this quote from Odum out of *Ecology and Our Endangered Life Support Systems*, he outlines the struggle to define and to maintain soil health in sustainable agricultural systems: *Ultimately, the fate of the soil system depends on society's willingness to intervene in the marketplace and to forego some of the short-term benefits that accrue from "mining" the soil so that soil quality and fertility can be maintained over the long-term.*

In the 1995, Agriculture and Agri-Food Canada publication *The Health of Our Soils: Toward sustainable agriculture in Canada*, Acton and Gregorich stated that *some Canadian agricultural soils are improving in health and becoming less susceptible to erosion and other damaging forces, mainly because of increased use of conservation farming methods over the past 10 years.* Twenty years along, this is especially true for Saskatchewan, where over 70% of producers practice conservation, minimum or zero-tillage.



### **CONFERENCE HOTEL – BLOCK OF ROOMS FOR SSCA MEMBERS ONLY**

The Home Inn and Suites (<http://www.homeinnsaskatoonsouth.ca/>) is the official hotel of the SSCA during Crop Production Week. This modern hotel is conveniently located off Highway 11 in Stonebridge, just minutes from both our venue, the Western Development Museum, as well as other CPW venues. There is a pool with a waterslide and hot tub for relaxing after a long day, parking and Wi-Fi is free and a great hot breakfast buffet is also included!

SSCA Members qualify for a reduced rate of **\$124 per night** (before taxes and fees).

To book: phone **1-844-657-4600** and request a room under the name Sask Soil Conservation.

A limited number of rooms will be held **until December 15<sup>th</sup> only**, so book now!

# Conservation Agriculture 2018



## SOIL HEALTH IN A NEW CLIMATE

The 30<sup>th</sup> Annual Conference of the  
Saskatchewan Soil Conservation Association

**Monday, January 8<sup>th</sup>, 2018**

**Western Development Museum – Saskatoon**

8:00 am	<b>Registration Opens</b>		
8:45 am	<b>Welcome and Opening Remarks</b>		
<b>Soil Health Session</b>			
9:00 am	<b>Considering Your Limiting Factors for Achieving Your Soil Health Goals</b> Daryl Chubb, PAg, Integrity Soils, Irricana, AB		
9:30 am	<b>Soil Conservation as an Adaptation to Climate Change</b> Dr. Dave Sauchyn, Professor of Geography & Environmental Studies, University of Regina		
10:00 am	<b>Soil Health and Greenhouse Gases</b> Dr. Mario Tenuta, University of Manitoba		
10:30 am	<b>Refreshment and Networking Break</b>		
10:45 am	<b>Soil Organic Matters for Soil Health</b> Dr. Kate Congreves, Department of Plant Sciences, University of Saskatchewan		
11:15 am	<b>Keynote Speaker: The Rulers of Underground &amp; How They Plan to Take Over the World</b> Jill Clapperton, PhD, Rhizoterra Inc., Spokane, Washington, USA		
12:05 pm	<b>Luncheon</b> – Address by Honourable Lyle Stewart, Minister of Agriculture		
<b>Farming Systems Session</b>			
1:00 pm	<b>A Focus on Biology to Restore Soil Health on Our Farm</b> Derek Axten, Producer, Minton, SK		
1:15 pm	<b>On-Farm Research Trials on Our Farm</b> Adam Gurr, Producer, Forest, MB		
1:30 pm	<b>Trying to Find the Right Mix on Our Farm</b> Jeff Odgers, Producer, Spy Hill, SK		
1:45 pm	<b>Solar Energy on Our Farm</b> Eric Leicht, Producer, Spalding, SK		
2:00 pm	<b>Producer Panel</b> Moderated by Jocelyn Velestuk, Producer, Agronomy Consultant, SSCA Director		
3:00 pm	<b>Refreshment and Networking Break</b>		
3:15 pm	<b>A Farm-Eye View: Applying New Soil Health Knowledge to Cropping System Design</b> Martin Entz, PhD, Professor of Cropping Systems, University of Manitoba		
3:45 pm	<b>Wrap-up</b>		
4:00 pm	<b>SSCA AGM</b>		
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### KEYNOTE SPEAKER

**Jill Clapperton, PhD**

Chief Scientist of Rhizoterra Inc., Spokane, WA



Jill Clapperton is the Principal Scientist and Co-founder of Rhizoterra Inc. She is a well-known researcher, international lecturer and advocate for practices that promote soil health. In 2013 she was the Syngenta No Till Innovator for Research and Education, other awards include the Environment Canada Patricia Roberts-Pichette Award for enthusiastic leadership and commitment to furthering ecological monitoring and assessment in Canada. Her company, Rhizoterra, believes that healthy soil grows healthy food and that makes healthy people (livestock, too). Our research farm in eastern Washington is a proving ground for new dryland crops, rotations, technology, and products that help create healthy, productive soils. We are also developing new technology to help farmers make real-time decisions about soil fertility, plant nutrition, and soil microbial activity. Rhizoterra wants agricultural businesses and consumers to make informed decisions about food based on science. For more information see [www.rhizoterra.com](http://www.rhizoterra.com).

“Underground Livestock”  
(Photo Credit Larry Reichenberger)

### The Rulers of Underground and How They Plan to Take Over the World

Plants, soils and the soil biota are the Rulers of the Underground. The dynamic interactions between these founding partners determine the basis for mineral nutrient dense food, clean water, purified air, and the wellness of our World. I like to think of farmers and land owners as the business partners or collaborators in facilitating the soil health revolution. I plan to introduce the key ruling families and talk about what they do, and how we can work cooperatively with them to create healthy productive soils. We will also look at how plants provide the network, infrastructure and currency that determines the function of the below-ground ecosystem, and how farmers and consumers can benefit.

## SOIL HEALTH SESSION



### **Considering Your Limiting Factors for Achieving Your Soil Health Goals**

Daryl Chubb, PAg, Integrity Soils, Irricana, AB

Originally from central Saskatchewan, Daryl has always been passionate about agriculture, the land, and its stewards, and is a Nuffield Scholarship recipient. Daryl will discuss the most common limiting factors that inhibit people to attain the goals or direction they want to follow. This will include a variety of items including mindset, management, and access to products. He will include some personal examples and farm operations that have stepped outside the "staus quo" and figured out different ways to move towards their goals.



### **Soil Conservation as an Adaptation to Climate Change**

Dr. Dave Sauchyn, Professor of Geography & Environmental Studies, University of Regina

One of the fundamental principles of adaptation to climate change is building resilient communities and economies by ensuring the health and integrity of the ecosystems that are basis of our food and water security. Most of the impact of climate change in western Canada will be caused by shifts in ecosystems and the availability of water. The resilience of agricultural ecosystems, to withstand climate extremes and change, is ensured through the proper management of soil and water. These best farming practices represent both adaptation to climate change and the foundation of sustainable agriculture.



### **Soil Health and Greenhouse Gases**

Dr. Mario Tenuta, Department of Soil Science, University of Manitoba

Dr. Tenuta's teaching responsibilities include undergraduate and graduate courses in Applied Soil Ecology at the University of Manitoba. His training includes a B.Sc. (Hon.) in Botany/Physical Geography from the University of Toronto, a M.Sc. in Soil Science from the University of Guelph, a Ph.D. in Plant Sciences from the University of Western Ontario and Post-Doctoral work in Nematology at the University of California at Davis. Dr. Tenuta joined the Department in September 2002 and served as Canada Research Chair in Applied Soil Ecology from 2006-2016. His research is currently focusing on mitigation of greenhouse gas emissions from agriculture including use of 4R nutrient management, plant nematodes including soybean cyst nematode, and Verticillium of potato and canola.



### **Soil Organic Matters for Soil Health**

Dr. Kate Congreves, Department of Plant Sciences, University of Saskatchewan

Healthy soils provide important ecosystem services necessary for sustainable crop production (such as carbon sequestration, nutrient recycling, water filtration, etc). Agricultural practices which maintain or enhance soil health will therefore contribute to the long-term resilience and productivity of soils. Soil organic matter is often considered the most important factor in determining soil health. So, a better understanding of the changes which occur to soil organic matter and its chemical composition will help us ensure that agricultural soils keep producing resilient crops for years to come. This talk will address why we should care about soil organic matter, what soil organic matter actually is in the first place, how science has changed our understanding of soil organic matter, and how soil organic matter can be lost or built depending on soil type and management.

## FARMING SYSTEMS SESSION



### **A Focus on Biology to Restore Soil Health on Our Farm**

Derek Axten, Producer, Minton, SK

Derek will share what he feels are the basics to regenerating soil health — how, with the use of compost, diverse rotations with intercrops, cover crops and the re-introduction of livestock, they are working to restore the soil food web and working to increase microbial diversity so that their soils can function properly. They feel by taking care of the soil biology and providing a suitable habitat, it will take care of their crops.



### **On-Farm Research Trials on Our Farm**

Adam Gurr, Producer, Forest, MB

Adam Gurr's farm has a long history of No-till and in 2012 they implemented a Controlled Traffic Farming system. Adam has been doing on-farm research for 20 years and is a great believer in the value of properly conducted on-farm research trials. He will summarize the results of some of his recent work and share what he thinks an on-farm research program could do for you.



### **Trying to Find the Right Mix on Our Farm**

Jeff Odgers, Producer, Spy Hill, SK

I grew up on a mixed farming operation outside of Spy Hill. I had a huge passion for the family farm and playing hockey. At 16 I left home to pursue my dream and dedicated the next 17 years to playing hockey in the winter and returning home in the summer to farm. I started farming full time in 2003 —the same year my parents and I converted our operations to organic. Our farm is 100% organic including the cattle. Soil health and rotations have been huge focus in the last few years.



### **Solar Power on Our Farm**

Eric Leicht, Producer, Spalding, SK

Eric farms 4,000 acres that yield abundant harvests of wheat, oat, flax and a variety of lentils. Keeping the soil healthy on the Leicht family farm near Spalding involves crop rotation, plowing nutrient-rich plants into the soil, and providing time for nature to renew the land by allowing acreage to lie fallow. "Soil is what makes your crops. That's the farmer's best friend."



### **A Farm-Eye View: Applying New Soil Health Knowledge to Cropping System Design**

Martin Entz, PhD, Professor of Cropping Systems & Natural Systems Agriculture,  
University of Manitoba

I remember sitting on an open-air tractor, doing fall tillage, and wondering how soil actually functions. As a teenager, I was curious. How is soil able to produce crops? Why do big tillage clods become soft soil by spring planting? How does straw decompose? After 4 decades of education, practical experience, and seeing soil management systems around the world, I have had many of my questions answered. And, the fantastic soil science community in Canada continues to produce new revelations each year!

My work at the University of Manitoba, which I conduct together with students, technicians and research associates, essentially involves designing cropping and farming systems based on what we know about soils and crops. The new knowledge about soil health has helped inspire new approaches to no-till; crop rotation; cover cropping; intercropping; crop-livestock integration; and precision agriculture. My goal is to harness more of nature's ecology in farming systems. I want to share some of our journey with you.

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### REGISTRATION FORM

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Additional Names \_\_\_\_\_

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Initial here to give express consent to allow the SSCA to use your email address for communications

<b>SSCA Members:</b>		
Early Registration	\$ 40.00	
After Jan 3, 2018	\$ 60.00	
<b>Non-Members:</b>		
Early Registration	\$140.00	
After Jan 3, 2018	\$160.00	
One-Year Membership	\$100.00	
Three-Year Membership	\$250.00	
<b>Total Payment:</b>	<b>\$</b>	

<b>Method of Payment:</b>	
<input type="checkbox"/> Cash	<input type="checkbox"/> Cheque (payable to SSCA) <input type="checkbox"/> Visa <input type="checkbox"/> Mastercard
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**Cancellation Policy:** SSCA will provide refund if notified before 12 noon, January 3, 2018