

# Outcomes Report

*"Taking Advantage of Carbon Pricing Opportunities" Sept 29, 2021, Webinar*

*Fertilizer Canada and Agriculture Carbon Alliance*

*Compiled by Viresco Solutions Inc*



**FERTILIZER CANADA**

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## The landscape

Today, there is increased interest in greenhouse gas (GHG) reductions globally, with companies and governments across the globe making net zero commitments. The most recent United Nations report showed us that global GHG emissions will be 16% higher in 2030 than they were in 2010 based on our current trajectory. This is aligned with a 2.7°C warming if all countries fulfill their nationally determined contributions (NDCs) by 2030 - not stabilization of temperatures to below 2 degrees C as the IPCC 6<sup>th</sup> Assessment Report identifies as an imperative to avoid catastrophic changes. Ahead of COP26 in Glasgow Oct-Nov 2021, 60% of countries have updated their NDC's, with 70 countries having a carbon neutrality goal for 2050, and many NDC's referring to nature-based solutions, agriculture, and international carbon markets as a means for meeting targets. Thus, carbon pricing mechanisms are needed to help countries and corporations reduce, avoid, and remove GHG emissions.

Carbon pricing can be done through three different pathways, through compliance markets, voluntary markets or through the supply chain. Compliance markets such as Canada's Output-Based Pricing System (OBPS) are regulatory carbon pricing systems. Voluntary markets such as Gold Standard and Verra, create a space for companies to voluntarily create projects for carbon offsets. Supply chain carbon (or insetting) is a carbon pricing system for large corporates who are setting science-based targets to reduce their scope 3 emissions (an investment in an emission reducing intervention within a company's supply chain or company sponsored the activity) or to put a price on carbon removals within the supply chain. Today, there are over 60 different compliance carbon pricing schemes and many voluntary market systems popping up as well.

## Key takeaways

The webinar strove to understand the following and all speakers were directed to touch on these where pertinent to their presentations:

- Understanding the basic characteristics of a carbon market
- What issues / opportunities currently exist in developing a market for carbon
- Status of generating credits through agricultural practices in Canada and globally
- Status of the 4R Climate Smart Protocol opportunity
- How policy / regulation will affect the development of these markets
- Scientific opportunities and challenges for implementation
- Understanding the grower perspective on carbon markets
- Where carbon marketing might be headed in the future

## Panel Highlights

### *Panel 1*

Karen Haugen-Kozyra, the president at Viresco Solutions introduced the topic of carbon markets and outlined some of the challenges in the industry today. Carbon markets include cap and trade systems, output-based pricing systems, emission trading systems and even carbon taxes. For many industries, carbon markets provide a monetary incentive for companies to reduce emissions, become more efficient or adopt new practices. However, for agriculture, there are still many barriers.

The main challenges include lack of experience for both suppliers and buyers of these credits, with only 0.2% of projects listed on voluntary markets from agricultural projects, and the difficulty in measuring GHG reductions or removals. Reductions and removals are incremental over time and diffuse across the landscape, meaning the cost of practice change is often more expensive than the carbon price available. Soils are a complex biological system, so carbon pricing relies on modelling and estimates. This can create challenges related to uncertainty, permanence, additionality, and leakage. With the lack of project experience and workable protocols in agriculture and nature-based solutions, protocols are still in the experimentation phase, with most of the work being done through pilot programs or in compliance markets. It should be noted that not a single verified tonne has been generated to date in all the activity going on south of the border (Indigo has indicated they will have verified tonnes on the CAR registry using the Soil Enrichment Protocol in Q2 2022 if all goes well). In Canada, the national offset system will have a protocol on enhanced soil carbon sequestration next year or the year after, and a protocol for nitrous oxide emissions' reduction in agriculture coming in a later phase of the program.

Dr. Mario Tenuta, Canadian Industrial Research Chair on 4R at the University of Manitoba, presented research that has been done to support the 4R Climate smart protocol. Any nitrogen containing material (fertilizer, manure, residue) can contribute to nitrous oxide via the nitrogen cycle. The main goal of 4R stewardship is to reduce nitrogen losses when applying nitrogen rich materials, which can reduce direct and indirect nitrous oxide emissions. This is done by applying the right fertilizer source at the right rate, at the right time and in the right place on a field.

Dr. Tenuta has worked to test different brands of enhanced efficiency fertilizers (including urease, nitrification, and double inhibitors) across different agricultural regions of Canada. Nitrification and double inhibitors have shown dramatic nitrous oxide reductions across spring wheat, corn, and canola crops over multi-year studies. Dr. Tenuta's research in 4R N<sub>2</sub>O management showed fall application increases nitrous oxide emissions when compared to a spring application. Dr. Tenuta estimated that a break even price for carbon at a gross value would be \$70 to cover off increased costs of using effective enhanced efficiency sources of fertilizers (this did not take into account transaction costs of bringing aggregated projects to the marketplace, resulting in even higher carbon prices to drive change).

Katie Sullivan, the Global Managing Director at the International Emissions Trading Association (IETA) presented the state of carbon markets and net zero initiatives in Canada and globally. Compliance and voluntary markets have increased in number and are now widespread globally. Canada's federal backstop is applied in jurisdictions that do not have a carbon pricing system that aligns in price or coverage with the federal benchmark. Currently the federal backstop has a price of \$40/tonne, with an increase in \$50/tonne in 2022. What happens after, up until 2030 is something to watch. Provinces could either gain or retain equivalency with federal backstop (up to \$170/tonne), which will provide even better monetary incentive for farmers. Internationally, there is growing demand for offsets in compliance and voluntary markets. Voluntary markets are growing significantly, with a growing number of projects in forestry and renewable energy. Companies are seeking high integrity carbon offsets and are turning to voluntary markets for this purpose. Due to this expected growth in voluntary markets, a taskforce on scaling voluntary carbon markets has been created to ensure integrity, standardization, alignment and commoditization with 450+ members across 250+ organizations.

### *Panel 2*

Dr. Dan Heaney, advisor to Farmers Edge and Fertilizer Canada, and President of Random Cross Consulting, outlined some of the opportunities in Western Canada. Reducing GHG emissions can be done through tillage-based carbon sequestration, nitrous oxide reductions and through cover cropping- based carbon sequestration. An example grower undergoing the advanced nitrous oxide emissions reductions protocol would be applying a double inhibitor or a controlled release product, doing variable rate application, spring application only, banding application in the subsurface, possibly split applying and could provide up to 35% reduction in nitrous oxide. Dr. Heaney made a case for rate reduction or yield increase as a means to make the practice change more cost effective at different carbon prices. A rate reduction of 10-20lbs per acre could allow for a net benefit with no carbon price, and make the practice change less costly even at higher carbon prices. Using something like SuperU® is an easy switch to make with carbon pricing partially offsetting that cost, but if you reduce rate or increase yields, it will be fully cost effective. Each farms circumstance is unique, and each farmer will have to look at the long-term benefits or co-benefits to see how it could improve their operation. Having discussions with growers to reduce their N rate for the purposes of N<sub>2</sub>O reduction is a hard sell and despite having several rate reduction protocols available in the voluntary market, virtually none have been implemented with some even rendered inactive on registries like the American Carbon Registry as a result.

Graham Gilchrist, the CEO of Biological Carbon Canada and part of Gilchrist Consulting, outlined the farm management perspective of carbon pricing. By looking at the farm marginal cost abatement curve, some practices are too costly (ex. controlled release fertilizer, side dress applicators), while some are cost effective (ex. digestible feeds, livestock health, direct seeding, electric machinery). Cost savings and revenue opportunities can include the regulated Canadian compliance market, voluntary carbon

markets, supply chain foot printing (insetting) and personal service agreements (ex. ALUS payments).

Dr. Calvin Booker, from Feedlot Health Management Services by TELUS Agriculture, provided a summary of capturing carbon credits through improved feed efficiency in Alberta's compliance Carbon Pricing System, using the Alberta Offset Fed Cattle protocol. Feedlot Health Management Services and Trimble Ag works with feedlots to lower GHG emissions using the Fed Cattle protocol and registering those reductions on the Alberta Emissions Offset Registry. They have worked with Alberta to develop the newest version of the protocol for fed cattle (first published in 2009, revised in 2012 and revised in 2016) and were the first to sell carbon credits through a three-year feedlot pilot using the 2016 version of the Protocol). Since then, more projects have been developed under the updated protocol. Dr. Booker's take home messages were that it is not a quick or easy process, but interest is increasing with the higher price of carbon. Creating a project for fed cattle requires cooperation between feedlot producers, experts who compile and analyze producer data and aggregators who build out the data management system and Monitoring, Reporting and Verification support (i.e. Trimble Ag).

Jocelyn Velestuk, an agronomy consultant and farmer, provided a farmer's perspective of the decision-making process when it comes to a farm's crop plan and taking part in carbon pricing schemes. When developing a strategy and crop plan, Jocelyn takes the following things into account: soil bioavailable nutrients, prediction model, seeding technology, fertilizer products, crop rotation, past management, and farmer's risk (rainfall or moisture level, costs). For example, in a low moisture potential year, Jocelyn may reduce the fertilizer applied, avoid planting a legume or pulse, and take the leftover nutrients into account for the next year's crop plan. She raises some important questions from the grower's perspective: What happens when your emission reductions are lower due to climate or moisture levels? Do you still get paid for practice or in tonnes reduced? How are reductions and removals treated differently?

## Implications for Canada's farmers

### *Opportunities*

Currently, there is more interest in carbon markets now because the price on carbon is increasing (ex. \$6-\$8/tonne for Ag credits in 2009 in Alberta to \$40/tonne in 2021). Large corporates (including food and beverage and crop input companies) are developing projects through their value chain to reduce scope 3 emissions and meet their global decarbonization commitments. This can provide opportunities for early adopters to be paid for verified carbon outcomes or reduce overhead costs of practice change by partaking in pilot studies or voluntary programs happening across the prairies. In western Canada, there are several ways to reduce GHG emissions through tillage practices, cover cropping and nitrous oxide reduction. Farmers following the nitrous oxide emissions reduction protocol (NERP) or the 4R Climate Smart protocol can find cost savings under current programs and carbon pricing involving 4R management to control N<sub>2</sub>O emissions, boost yield along with the use of enhanced efficiency fertilizers. The application of NERP or the 4R Climate Smart protocol can be done at a basic, intermediate, or advanced level, which provides an opportunity for a range of producers. The price of carbon will only continue to increase in the voluntary markets (approximating \$15 to \$20 per tonne) and Canada's escalating carbon price up to 2030 (\$170/tonne).

Looking forward, Canada's national offset system will have a protocol on enhanced soil carbon sequestration and a protocol for nitrous oxide emissions reduction in agriculture coming in a later phase of the program.

### *Barriers*

Farmer involvement in carbon markets can be difficult due to the incremental carbon yield estimated by protocols. For example, the Conservation Cropping Protocol in Alberta estimates on average, a 0.1 tonne/acre carbon yield depending on which region the farm is in. At \$40/tonne of carbon, and a return to the grower of 70% or the sale by the project developer who aggregates a number of farms to attract a buyer, that translates to \$2.80 per acre. Meeting the market requirements of the Standards body and/or Regulator in these markets is not an insignificant cost – project developers are essentially taking on the risk, liability, legal and verification costs for collating a robust data tracking system, as well as reporting and maintaining permanence of stored carbon (for 100 years) to create the carbon credit. Protocols require good data, which can be a barrier to involvement in carbon markets for small operations.

To involve farmers in carbon pricing opportunities, there needs to be a monetary incentive to their operation, otherwise there is a high amount of risk associated with practice change. For example, the cost of enhanced efficiency fertilizers is high, and under low carbon prices the carbon price per tonne only partially offsets practice change. Adopting cover cropping (intercropping or polycropping) also has a cost associated with seed and can be challenging logistically in many regions. There is also a lack of clarity on what happens if a reversal of stored carbon occurs between the various programs and markets

– so, it’s important to read the fine print in contracts to understand who bears which financial burdens (the grower or the project developer – in Alberta, it explicitly says in the protocol that this liability rests with the project developer). As these traditional markets progress, practices will eventually become “business as usual” and no longer additional, as adoption increases and baselines are reassessed by the Standards bodies/Regulators over time. The Alberta Conservation Cropping Protocol uses a unique approach to additionality, called proportional additionality, developed in the 2006 timeframe by a Fed-Prov-Territorial government and producer group led by Agriculture and Agri-Food Canada. The approach balances accommodating early adopters with late adopters, and the calculated carbon being adjusted by the adoption rates of No Till, according to the methods in our National Emissions Inventory and adoption rates from the Census of Agriculture. The adjusted coefficients for the protocol regions result in 1 tonne of carbon credited for every 3 tonnes sequestered. It is for this reason, that several companies are applying the Conservation Cropping Protocol stacked with the 4R Climate Smart Agriculture Protocol in Alberta to reflect a true sustainable cropping system since the same equipment delivers seed and fertilizer in a precise fashion without disturbing the soil.

Measuring soil carbon change is challenging due to the high variability across soils over time, space, and depth. As new technology becomes available, there could be a disconnect between what evidence current protocols need and what evidence may be available in the future. In this case, protocols may need to be rewritten or updated frequently based on new technology that comes available and protocols need to be flexible enough to include future improvements in measuring and monitoring as they come available.

## Actionable outcomes

- More experience in agriculture-based carbon pricing is required for large-scale GHG reductions through carbon markets.
- Interest from large corporates and farmers to reduce on-farm GHG emissions is increasing.
- Although there is a limited number of protocols for use in GHG reductions, avoidance, and removals in Canada currently, there are several practices such as no till, enhanced efficiency fertilizers and feeding strategies that are being adopted as part of these protocols.
- Despite high costs associated with practice change, evidence is showing that practice change can be cost effective under alternative strategies and with a higher price of carbon.
- Including farmer decision making and input is key for practice adoption and further farmer involvement in carbon markets.