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that the new tax will place undue economic costs on the ag sector?

SPECIAL REPORT

CARBON TAXATION

A federal mandate to reduce Canada’s greenhouse gas emissions by levying a tax on fossil fuels, emissions and fertilizers has not been well received. Are farmers justified in their fears that the new tax will place undue economic costs on the ag sector?

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anada’s plan to implement a tax on greenhouse gas emissions has caused a fair 

bit of hand wringing among prai-

rie farmers. However, the financial impact of a carbon tax on the western Cana-

dian agriculture sector could be far smaller than expected, accord-

ing to agricultural economists at the University of Saskatchewan.

That’s because biological emis-

sions, which are those associated with growing crops or raising live-

s, will not be taxed under Otta-

w’s proposed carbon tax plan.

In addition, Ottawa has indicat-

ed that the consumption of gas-

and diesel fuel by agricultural producers will be exempt from a proposed fossil fuel levy.

For farmers, that means the greatest financial impact will likely be felt indirectly and be reflected in higher costs for some goods and services used by farmers, such as agricultural inputs, nitrogen fertilizers, farm chemicals, transportation services and freight rates for moving grain by rail.

“If you look at where most emis-

s come from (in the agricultur-

sector), a lot of them are bio-

logical emissions from things like fertilizer applications … methane emissions from cattle, et cetera, et cetera,” said Peter Slade, an agri-

cultural economist at the U of S.

“But all of these things are not going to be taxed under the federal plan or under any provincial plans that I’ve seen, so all of those types of things would be counted out-

side of the carbon tax,”

Skolrud said, another ag economist at the U of S, agreed.

Although all the details of the federal carbon tax plan have yet to be unveiled, it looks like consump-

tion of fossil fuels on the farm will be tax exempt, at least for the time being,

Slade said.

“Realistically, they (farmers) are just going to be looking at indirect effects, said Skolrud, an assistant professor in agricultural econom-

ies. However, they might end up paying more for certain farm inputs. … The biggest potential is for higher nitrogen fertilizer costs because producing nitrogen fertilizer is a very energy intensive pro-

cess, and nitrogen fertilizer manufactu-

ers are taxed, there’s a chance that some of those costs will get passed on to the final purchasers.”

However, Skolrud said domestic producers of nitrogen fertilizer will be forewarned to make competitive level, relative to nitro-

gen fertilizer products imported from the United States or elsewhere.

Slade and Skolrud said there are many unanswered questions sur-

rounding the federal carbon tax program. It remains to be seen how things will roll out, but prairie farmers should not assume that the implement-

ation of a carbon tax will be the difference between financial success and financial failure on the farm.

In general, economists agree that it makes more sense to tax pollu-

tion, which has a negative impact on society, rather than retail sales, which contribute to a healthier economy.

In theory, a carbon tax would be revenue neutral, meaning reve-

nues that are collected could be used to offset existing taxes in other areas.

Ottawa offered some hints about what form the federal carbon tax will take in the Technical Paper on the Federal Carbon Pricing Back-

stop, available at bit.ly/2suM1bE.

According to the paper, all prov-

inces in Canada will have the lati-

dude to come up with their own carbon pricing systems. However, the federal govern-

ment’s carbon pricing “backstop” will kick in if a province doesn’t come up with its own pricing and taxation plan.

The federal backstop will price carbon dioxide or carbon dioxide equivalents at $10 per tonne in 2018, increasing to $50 per tonne by 2022.

In addition, Ottawa will also introduce:

• A tax levy on all types of liquid, solid and gaseous fuel, including gasoline, diesel fuel, natural gas, propane, fuel oil and coal and even waste tires with exemptions granted on certain types for agri-

cultural activities.

• An output-based pricing sys-

emissions associated with air pollution, which has a negative impact on public health, compared to the impact of CO2 emissions.

In general, economists agree that it makes more sense to tax pol-

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tem that will apply to all indust-

trial facilities that emit 50 kilo-

tones of carbon dioxide equivalent per year.

For gasoline consumers, the fuel levy will be equivalent to a tax of $2.33 cents per litre in 2018 and increasing to 11.63 cents per litre in 2022.

Some groups will be exempt from paying the fuel levy, including “registered farmers” involved in “certain farming activities.”

The Saskatchewan government opposes a carbon tax, suggesting it will discourage economic activity. There are also lingering questions about the value of activities that reduce greenhouse gas emissions and sequester carbon. Most nota-

bly, the adoption of zero-till or minimum till production systems.

In a recent academic paper co-author helped the University of Sas-

katchewan economists Lana Awada, Richard Gray and Cecil Nagy, the economic value of adopting zero-till in Saskatchewan was estimated at $500 million between 1985 and 2012.

That’s included the value of sequestered carbon ($542 mil-

lion), CO2 reductions related to reduced energy use ($21 million), and gains from reduced nitrous oxide emissions ($1 million).

The researchers assigned a value of $5 as the social cost of emitting a tonne of carbon dioxide or carbon dioxide equivalent.

By comparison, Ottawa’s back-

stop tax is worth a value of $10 per tonne in 2018, increasing to $50 per tonne by 2022.

Awada said it’s a “tough” if farm-

ers will receive credits or compensa-

tion for adopting production systems that sequester carbon and benefit the environment.

However, she thinks their efforts should be rewarded.

“Farmers’ adoption of zero till-

age has probably made the largest contribution to the reduction of greenhouse gases in Saska-

tchewan, but to date farmers have not yet been compensated for that,” she said.

“Carbon credit programs to reward on-farm carbon sequestera-

tion are needed. These programs will help farmers get an idea about the GHG emissions associated with particular practices and the pros-

pects for earning carbon credits.”

The Saskatchewan Soil Conser-

vation Association has proposed that Saskatchewan farmers, in partnership with the Scottish-

the bank would allow farmers to 

offsets in exchange for adopting carbon-reducing practices on the farm, such as minimum till production.

The credits accumulated in the bank could then be used to pay other carbon-related taxes or pen-

alties that are levied by any level of government under federal or pro-

vincial carbon tax schemes.

Farmers would not be responsi-

ble for calculating their own soil carbon levels. That responsibility would rest with the organization responsible for running the carbon tax program and would be based on farmers’ management practices.

N.O traps 298x more solar radiation than carbon dioxide can.

CIF traps 22x more solar radiation than carbon dioxide can.

DID YOU KNOW? • The amount of nitrogen contained in soil organic matter is generally equal to 10 percent of the carbon stored in the soil. It is estimated that the adoption of zero-till production practices in Saskatchewan has contributed the equivalent of $2.9 billion worth of nitrogen to Saskatchewan croplands since the mid 1980s.

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Greenhouse gases (GHGs) are atmospheric gases that can absorb and trap solar radiation. This increased atmospheric heat is responsible for the greenhouse effect, also known as global warming.

Greenhouse gases include methane (CH₄), nitrous oxide (N₂O), and carbon dioxide (CO₂). Once released into the atmosphere, these gases don’t react to changes in temperature or air pressure, so they have a long-lasting impact on climate change.

This is how farming practices can contribute to—or reduce—greenhouse gases:

**Carbon Dioxide:** Produced when soils are tilled. Zero-till practices can help to reduce CO₂ release.

**Methane:** Produced by livestock, mainly ruminants, and also from manure stored in anaerobic conditions.

**Nitrous Oxide:** Nitrogen fertilizers contain N₂O and are the biggest contributors to greenhouse gases in crop production. Fertilizers in the soil release some N₂O into the air, but modern equipment and fertilizer products can help reduce this process.

**Crop Production:** With modern no-till practices, crops can grow bigger and set deeper roots in the growing season. This leads to greater carbon sequestration—the ability of a plant to pull carbon from the air and store it in the soil. This is what’s known as a carbon sink.

**Climate Change:** Global warming from greenhouse gas emissions are expected to extend growing seasons in Western Canada, but will also cause more violent swings in weather that will lead to drought or flooding.

**Farming Practices:** An increase in the number of growing days will increase crop productivity because plants can grow bigger and set deeper roots in the growing season. This leads to greater carbon sequestration— the ability of a plant to pull carbon from the air and store it in the soil. This is what’s known as a carbon sink.

**Air Travel:** In 2015, air travel accounted for 2% of all GHG emissions.

**GHG Emissions in Canada:** In other words, farming contributes 8% of all GHG emissions in Canada are produced by agricultural practices. In 2015, air travel accounted for 2% of all GHG emissions.

**GHG Emissions:** GHG emissions are measured in CO₂ equivalent (million tonnes):

- **Carbon Dioxide (CO₂):** Produced by livestock through respiration.
- **Methane (CH₄):** Produced by livestock, mainly ruminants, and also from manure stored in anaerobic conditions.
- **Nitrous Oxide (N₂O):** Nitrogen fertilizers contain N₂O and are the biggest contributors to greenhouse gases in crop production. Fertilizers in the soil release some N₂O into the air, but modern equipment and fertilizer products can help reduce this process.

**Sources:** Agriculture Canada, Environment Canada, staff research | MICHELLE HOULDEN GRAPHIC
Alberta’s carbon tax plan may offer insight for others

BY SEAN PRATT
SASKATCHEWAN REGION

There has been much hand wringing in the farm community about carbon taxes but the experience hasn’t been too bad so far in the one prairie province that has one.

“The hit wasn’t as hard on a lot of producers as we thought it was going to be,” said Lynn Jacobson, president of the Alberta Federation of Agriculture.

Between the exemption for farm fuel and the ability to offset the new tax with carbon credits, many producers are finding it to be a manageable increase in costs.

“I think agriculture somewhat escaped or dodged a bullet,” he said.

Alberta introduced its carbon levy program on Jan. 1, this year. It is said.

The federal government says provinces that do not have their own program will be forced to adopt one based on the model Alberta is using.

Alberta’s tax amounts to $20 per tonne in 2017, rises to $30 per tonne in 2018 and will eventually reach Ontario’s mandated $50 per tonne by 2022.

Andrew Leach, associate professor at the Alberta School of Business, chaired the Alberta Climate Leadership Panel that recommended the lion’s share of what became Alberta’s carbon levy.

The big win for agriculture is that farmers are finding it to be a man- 

agerable and in some cases a revenue-neutral program.

“I think agriculture somewhat escaped or dodged a bullet,” he said.

Alberta has produced a document that states the direct cost of the tax on an average household with a couple and two children will be $138 in 2017 and $508 in 2018. An estimated 60 percent of household will get a full rebate due to their incomes.

There have been no estimates on what it would cost the average farm because there is too much variability in farm operations, said Leach.

Scott Hennig, vice-president of communications with the Canadian Taxpayers Federation, said the levy will result in a lot of hidden costs for farmers in the form of things like higher transportation costs.

“Even if you’re buying a new piece of machinery, it has to get to you here. It’s not being manufactured in Oils or something like that,” he said.

Hennig said the tax will be built into everything farmers pay for including crop inputs.

“They’re planning on pulling a whole pile of money out of the economy,” he said.

The government estimates the levy will generate $3.85 billion over the next three fiscal years, all of which will be reinvested in the Alberta economy.

“The biggest thing we were looking for in designing the policy was protecting trade-exposed industries,” he said.

“Like doubling of their value gets farmers a bigger tax break,” he said.

That’s sort of backwards, “ he said.

They’re planning on pulling a whole pile of money out of the economy,” he said.

The government estimates the levy will generate $3.85 billion over the next three fiscal years, all of which will be reinvested in the Alberta economy.

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CARBON TAX: A bitter pill for farmers

Farmers are already using better management practices to minimize their carbon footprints, and many say carbon pricing can’t help them to do more.

BY KAREN BRIERE
REGINA BUREAU

From his west coast vantage point, Stan Vander Waal isn’t sure that carbon taxes do what proponents say: change behaviour to reduce greenhouse gas emissions.

The chair of the British Columbia Agriculture Council and owner of Chilliwack-based Rainbow Greenhouses has had nine years to observe the tax in practice.

He said his operation was already using the latest technology to reduce fuel costs when the tax was imposed July 1, 2008.

“The on the greenhouse side, the perception was that we would burn less fuel,” Vander Waal said. “That’s one our highest input costs.

But he’d already installed innovations such as curtain and shade systems and double-walled panels to reduce that cost.

“There just isn’t anything that would support that next level of efficiency,” he said.

Ontario has said that carbon plans will be mandatory nationwide in 2018. Provinces are expected to design their own systems or the federal government will impose one. It can be a cap-and-trade system or a carbon tax.

In B.C., the initial tax was $10 per tonne of carbon dioxide equivalent on heating and transportation fuel, rising to $30 per tonne of carbon dioxide equivalent on other fuels. It has been since 2012.

The idea is that a tax will cause people to gradually reduce fuel use and adjust their habits.

It is also supposed to be revenue-neutral, so all money taken in from the tax is returned through personal and corporate income tax breaks.

A Fraser Institute study earlier this year, however, said the tax ceased to be revenue neutral five years ago as the government moved to more targeted tax cuts, away from broad-based cuts that would spur economic growth.

Farmers have long opposed a carbon tax, arguing that with it, they can’t compete against producers in jurisdictions without a similar tax.

The B.C.-greenhouse sector was successful in obtaining a permanent 80 percent rebate on natural gas but others weren’t so lucky.

“A chicken farmer using natural gas is not getting a rebate,” Vander Waal said.

The government also later exempted farmers from paying the carbon tax on coloured gasoline and diesel used on farms.

Vander Waal said that helps only a little because hauling crops to storage, delivering feed and trucking livestock to market are not exempt.

“All these add on layer after layer after layer of carbon tax,” he said.

The average farmer is paying about $1,000 per year in carbon tax, so no one is likely to go broke over it, he added, but it cuts into the money that farmers have available to reinvest and make their businesses more efficient.

The Pacific Institute for Climate Solutions, which is funded by the B.C. government, released a study in 2014 that found no evidence agricultural exemptions were needed. It noted there was no change in agricultural trade after the tax was imposed.

The study also said that fossil fuels represent on average only four percent of production costs. A carbon tax, therefore, adds only a small cost. It added that farmers may have changed practices to become more energy efficient.

Farmers across Canada could argue that’s exactly the point. In many cases they have taken measures to minimize their carbon footprint through better management practices that use less fuel and sequester carbon.

Yet, they will be paying the carbon tax all along the way without any ability to recover it.

What’s happening outside of B.C.?

In Alberta, the $20-per-tonne carbon tax implemented Jan. 1, 2017, applies to heating and transportation fuel but exempts farm fuels. The tax rises to $30 in 2018.

The tax is returned to some low-income residents through a rebate, but most of the money goes toward programs for renewable energy and energy efficiency.

Ontario and Quebec both decided to use a cap-and-trade system rather than a carbon tax. This system caps emissions but allows flexibility in how that cap can be met.

Emitters who exceed their caps can buy credits from others with surplus credits.

The Ontario Federation of Agriculture was initially supportive of this type of system but now says it isn’t working.

Fuel costs have risen with no way for farmers to offset them; they aren’t exempt under the cap and trade program.

The remaining provinces, except Saskatchewan, are still working on their plans.

Saskatchewan maintains it will not impose a tax that will hurt its agricultural sector.

If that is the case, then Saskatchewan farmers can likely look forward to a system similar to Alberta’s, according to federal Environment Minister Catherine McKenna’s announcement earlier this year.

It will start with a $10-per-tonne tax on fossil fuels and ramp up to $50 per tonne by 2022. The federal government is accepting comments on the proposed plan until June 30 at carbonpricing@canada.ca.

Back in B.C., Vander Waal said he believes all governments would have been better off setting emissions standards rather than taxing inputs.

“The general perception is that most people are just not being more efficient. I think that’s nonsense,” he said. “Any business is always trying to reduce costs.”

He said public perception drove the need for a carbon tax but few city dwellers realize what was already being done in agricultural sectors.

“A carbon tax doesn’t drive efficiency,” Vander Waal said. “Governments should really learn what’s going on on the farm. There’s little knowledge of what’s really been done.”

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This is the second of three instalments examining the issues surrounding carbon pricing, greenhouse gas emissions and how farmers can do their share without having to pay more than their fair share to do it.

See the entire series online next week at www.producer.com.
Scientists find surprise in soil’s freeze-thaw cycle: nitrous oxide emissions

**QUICK FACTS**
- In 2015 nitrous oxide represented about five percent of all greenhouse gas emissions in the U.S.
- One tonne of N2O released into the atmosphere is equivalent to 300 tonnes of carbon dioxide
- Agricultural soils and the use of nitrogen fertilizers are responsible for about 75 percent of all N2O emissions in the U.S.
- The site in Elora, Ont., also showed more emissions in the winter thaw period, but the spike wasn’t as noticeable as the Manitoba results.
- The N2O emissions released more consistently from January to March in Ontario, possibly because the climate is milder so thaw is more likely to occur in the middle of winter.
- On average, the percentage of annual N2O emissions from the freeze-thaw phenomenon was 53 percent at the Manitoba site and 29 percent in Ontario.
- The results surprised experts who had thought that nitrous oxide was released primarily in the growing season, especially the spring period following fertilizer application.
- The results from Manitoba and Ontario showed that colder soils release more N2O during spring thaw.
- Wagner-Riddle said the data from Manitoba show the soil for that site was much cooler and emissions therefore were also higher.
- Laboratory results back up the finding. When soil samples chilled to -15°C, it releases more nitrous oxide than a soil taken to -5°C.
- "The intensity of freezing, meaning how low the temperature gets...that impacts what happens at thaw," said the scientists used the results from the Glenlea and Ontario sites to estimate the amount of N2O released globally from agricultural soils. Using computer models, they calculated that the freeze-thaw cycle adds 17 to 28 percent to all nitrous oxide emissions for agricultural soils.
- Most of those additional emissions would come from Western Canada, the U.S. Midwest, northeastern China, Kazakhstan, Russia and Ukraine.
- The area of cropland that freezes is minimal in the Southern Hemisphere, the paper said.
- "But there are many areas of cropland in the world that freeze (and) where these emissions are significant," Wagner-Riddle said. "There’s been a lot of study on that.
- Wagner-Riddle and her colleagues found nitrous oxide emissions in Canada and come up with global estimates, but they don’t fully understand what is happening in the soil and why N2O is released during spring thaw.
- "We don’t exactly know the mechanism," she said.
- That will require further study. The scientists hope to duplicate the research in Saskatchewan to see if results from Manitoba’s Red River Valley apply to other parts of the Prairies.

**CARBON SEQUESTRATION**

Farmers with the goal of sequestering maximum carbon in their soil will plant alfalfa or canola. That was the quick answer to the “best crops to keep carbon” question from Agriculture Canada researcher Brian McConkey.

"Alfalfa is a nitrogen fixer that puts lots of resources into its roots, keeps the soil dry so it reduces decomposition and does that job even during drought years," said the researcher.

"Under the same conditions, it will produce more carbon than any other annual crop than we’re aware of," said McConkey.

That applies to crops under prairie conditions without irrigation, he added.

The production of canola on million and more acres mean more carbon is being added to the soil generally.

"Crop specialist Ross McKenzie doesn’t name canola as the best annual for the job, though its part of the mix.

"We’d probably find that there’s not a huge difference," he said.

"The more root material, the more organic matter you’ll add and also the more precipitation and the more fertilizer you put on, the better the growth and the better the organic matter added by the roots.

McKenzie said prairie grasses and perennial forages should have a prominent place on the list of crops good at sequestering soil carbon. He participated in a wealth of research on soil organic matter, a.k.a. carbon, during his years with Alberta Agriculture.

McKenzie said it’s estimated that about half the organic matter held in the soil was lost in the first 40 to 60 years after prairie soil was cultivated. Some of that has been regained with the arrival of minimum and zero tillage.

"If you want to build soil organic carbon, the first thing you do is reduce frequency of summer fallow or eliminate it completely," he said.

"Crops with good root growth will build more organic matter, thus sequestering more carbon, so providing adequate nutrition aids in that effort.

However, annual crops are bred for above ground yield, not for root growth. That’s where drought hardy native grasses excel because they put a lot of energy into root growth and root mass as a hedge against drought.

The best plan for soil carbon sequestration is to mean a continual accumulation, McKenzie added. Levels eventually reach an equilibrium where carbon input through organic matter equals carbon output through crop removal and organic decomposition.

"They should be worried about maintaining the quality of their soil," said the researcher. "They should be worried about keeping the soils clean.

Western Producer earlier this year that carbon sequestration increases when trees are added to the list, assuming the climate is conducive to growing trees.

He said annual cropping and grazing can add 12 to 20 tonnes of carbon per acre, but when trees are added, 60 to 80 tonnes can be sequestered.

The carbon held in the soil can be a tricky thing to measure, McConkey said.

"Precision is needed, and changes in soil carbon are more easily detected over several years.

"It takes a lot of measurements to detect changes over short periods of time," he said. "That means we need to be fairly small in any one year but it can be done.

He’s urging farmers for carbon sequestration as a viable option, as the Alberta precedent shows.

However, if farmers are paid for carbon sequestration, they must be willing to accept a regional average or estimate on how much carbon their land has sequestered because farm-by-farm tests are impractical.

McKenzie said he doesn’t favour pay for farmers to keep carbon in their soil because good farming practices would ensure that happened anyway.

"I think that should be something farmers should be aware of, using the best rotations to really build up the quality of their soil but not really be worried about getting paid for it," he said.

"They should be worried about maintaining the quality of their soil.

He also wonders if farmers would be asked to pay back the money they received for sequestration if they changed the crops or practices they were using to obtain payments.

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Australian farmer Michael Inwood prepares his no-till drill, which is pulled by an electric truck on his farm near Bathurst, about 162 kilometres west of Sydney in May of 2009. Australian farmers were being encouraged by the government of the day to shift their practices to create more carbon sequestration in exchange for soil carbon credits.

BY MICHAEL RAINE
SPECIAL CORRESPONDENT

Some Australian farmers saw the costs rise as new taxes shifted money from producers and processors to carbon reduction projects across that continent. However, a change in government put a stop to all that. Half a dozen years ago, a Labour government in Australia brought in an ambitious program that quantified greenhouse gas emissions from across society and set a price on them, transferring greenhouse gas taxes to those who were avoiding emissions or reducing them. Three years ago this month, a Liberal government canned the idea.

Farmers were exempted from paying the Australian tax directly, but they did absorb costs passed on to them by other industries. Electricity, steel and other manufacturing sectors shifted their costs onto producers. Irrigation farmers who relied heavily on electricity saw large increases, along with other operations that rely on that power for fans, grain handling and processing. Under the carbon pricing program, emitters were allowed to earn marketable carbon credits in a scheme that paid them for shifting methane production from live-stock to power generation, stopping pasture and field burning and improving carbon sequestration in soils. The hog industry saw government grants flow into some of its manure lagoons to sew those up.

“It didn’t last long, the carbon tax. By now we would have seen more costs for farmers, no doubts. Transportation fuels were set to be includ-ded,” said Don Campbell, a Victoria state crop and livestock producer. The government said exemptions for agriculture were largely due to the complexity of quantifying greenhouse gas production, but some opponents of the carbon pricing programs felt it had more to do with the tax being unfashionable for food production.

The University of Melbourne and others developed greenhouse gas emission measurement models, which showed that agriculture was responsible for about one seventh of the nation’s output. The government measures, models, encourages producers to reduce emissions and reports results through its department of energy in a process mandated in legislation beginning in 2014. “It was the irrigators that took the big blow, the ones on the grid. Some electricity prices really jumped after the tax came on,” said Campbell.

“There were some tax credits available for us, if you participated in programs or bought new gear.” A 15 percent tax credit was created for farmers who bought conservation tillage equipment in 2013 and 2014. That ended after the carbon pricing bill was repealed. As part of the Carbon Farming Futures fund, which was set up during the Labour government’s experiment in carbon pricing, dozens of agricultural research programs were initiated by farm groups and universities, looking at mitigation opportunities and carbon credit development. Australia has had a carbon market since 2006 and has flirted with cap and trade regimes. Agricultural producers can sell credits based on their management practices.

The Clean Energy Regulator now audits and ensures that carbon credits earned are legitimate, but farmers are responsible for providing empirical evidence of carbon emission improvements. The CER also auctions credits and abate ment projects.

Louisa Kiely, who runs an agricultural carbon credit firm in Australia, said the Australian model of selling credits has credibility in the global marketplace. As a result, farmers can earn salable Australian carbon credit units by practicing conservation tillage, finishing beef cattle faster while still on pasture to reduce methane, and improving inefficient water and manure pumping systems on trees and planting trees.

The director of Carbon Farmers Australia said producers can participate in 25 and 100 year projects that generate credits that the government has been guaranteeing on behalf of large emitters, providing producers with 10 years of payments for their credits. Said Campbell: “It still appears a bit wobbly, but for those that are getting an income from it, I am sure it’s great.”

The last three CER auctions of Australian carbon credits saw prices of $10.23, $10.69 and $11.82 per tonne.

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Farmers in export-dependent countries might struggle under tougher European emission laws.

**BY ED WHITE**

Farmers might struggle under tough EU emission standards because the farm sector is stagnant and oriented toward domestic production, but it's another thing for farmers operating in places like Canada, where agriculture is growth and export oriented.

That's what two European Union countries in the Canadas are grappling with as increasingly tough EU environmental regulations are imposed.

"The ongoing challenge for the dairy sector to minimize its impact on the European environment in more intensively farmed regions in Europe won't end because policymakers will continue to increase the cost of doing business," said a Feb. 10 commentary by Dutch dairy supply companyWagengt Group.

"In the future, a greater focus on innovation to curb per-cow emissions while improving land-use efficiency will be needed."

That's fine for most EU countries where domestic production dominates agriculture. Most farmers in those countries can manage emission reduction targets by increasing per animal or per acre farm efficiency. But a few countries with small populations, like the Netherlands and Ireland, see agriculture a different way. They are similar to Canada in that they have an export-oriented agricultural industry, and they view providing food security that can provide export growth and new opportunities.

Farmers have a long run headlong against toughening EU regulations and restrictions on carbon emissions and nutrient runoff. Not only do the changes make increasing agricultural production problematic on a per-animal-unit basis, but those nations face additional challenges if their overall national agricultural emissions are a significant proportion of total national emissions.

Countries with comparatively small agriculture industries can more easily handle overall carbon and nutrient emission demands by requiring more from other sectors and less from farming. They don't face the same recession and if they need to reduce their farming sectors.

The EU knows it is walking a fine line between trying to squeeze carbon and other emissions out of agriculture while providing food security.

"The agriculture sector needs to address the twin challenge of reducing its greenhouse gas emissions while at the same time delivering a vital service to society with a growing global population: food," stated a European Commission paper discussing the EU's attempts to both reduce emissions and provide a secure supply of food.

"A significant decline in live-stock numbers and more efficient applications of fertilizers and better manure management reduced the EU's emissions from agriculture by 24 percent between 1990 and 2012."

"Given the central importance of food in our lives, a further reduction of greenhouse gas emissions from agriculture remains quite challenging. Nevertheless, there is still potential to further reduce both greenhouse gas emissions linked to food production in the EU."

The paper also mentions capturing methane from manure, better efficiency in using fertilizer and higher efficiency in meat and dairy production as examples of where gains could be made.

It also notes that reducing food waste would reduce emissions that the wasted food created during production.

Innovation efforts are going on across the EU, but unless a dramatic decline in emissions can be achieved quickly, countries like the Netherlands and Ireland will have problems increasing food production and meeting reduction targets.

Danf farmers have been given a series of reprieves from EU manure-spreading restrictions, but if another one is not provided by the end of 2017, its dairy farmers will have to reduce phosphate emissions by 8.2 million kilograms. That's roughly equivalent to the elimination of 170,000 cows and a 10 percent reduction in Dutch milk production.

Ireland is similar to the Netherlands in being a relatively small country with a relatively large farm economy. However, agriculture is an even bigger part of Ireland's economy, making carbon emission reduction even more challenging than the challenges Dutch farmers face with phosphate reduction.

Agricultural emissions of greenhouse gases make up about eight percent of Dutch emissions, but more than 30 percent of Ireland's.

"Ireland is another country with an outsized farm impact on national emissions, at about 18 percent."

Dairy is a much bigger emitter of greenhouse gases than other types of livestock and crop farming. That should signal that there are opportunities in dairy to make emission reductions through innovations, but it also makes expansion difficult while also complying with overall emission limits.

Yet the Irish, coming out of the 2008-09 world financial crisis, have been hoping for huge increases in agricultural production. According to Ireland's 2010 strategic plan, Food Harvest 2020, the country wants:

- an increase of 33 percent in the value of primary agriculture
- a 42 percent increase in the value of agriculture and food exports
- a 50 percent increase in milk production
- a 20 percent increase in beef production

By 2015, Ireland was producing 30 percent more milk than in 2007-08 and was on target to hit its 2020 goals.

The EU has shown willingness to treat agriculture as different from other industries because agriculture provides food and security. It has signalled a willingness to allow agriculture-concentrated member states more leeway on greenhouse gas emissions.

However, if EU restrictions continue to tighten in coming decades, as most expect will happen, how agriculture and emissions controls can learn to co-exist is something many are anxiously watching.