GrainsWest

Connecting Farmers, Food and Ideas

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Single Check-off = Creating Value at Lower Cost

Alberta Wheat COMMISSION

The Alberta Wheat Commission (AWC) is transitioning to a single check-off of $1.09 per tonne effective August 1, 2017, and consolidating all current AWC programs with WCD obligations in a model directly accountable to Alberta farmers. This is a 9-cent per tonne reduction from the $1.18 per tonne farmers are currently paying through the combined AWC and WCD check-offs.

Here's how it works

Alberta farmers currently have two wheat check-offs on their cash ticket

$1.18 per tonne total check-off

Alberta Wheat Commission (AWC)
$0.70 per tonne

Western Canadian Deduction (WCD)
$0.48 per tonne

AWC Program Priorities
Investing in new varieties, agronomy and extension programs to improve farmers' bottom lines. Developing international markets as part of Team Canada, improving market access and grain transportation. Policy advocacy representing Alberta farmers' interests. Consumer outreach to create awareness. Promoting sustainable production practices.

Variety Development
Core funding for wheat breeding programs at Agriculture and Agri-Food Canada and universities that has produced most of the varieties grown by Alberta farmers today, including CDC Go, AC Stettler, AC Foremost and AC Penhold. This funding is currently administered by the Western Grains Research Foundation (WGRF).

Canadian International Grains Institute
Core funding for the Canadian International Grains Institute (Cigi) in Winnipeg, which provides market support, training and technical services to Canada's key wheat customers.

As of August 1, 2017

$1.09 per tonne total check-off

$1.09 per tonne
A single wheat check-off administered by AWC and accountable to our members.

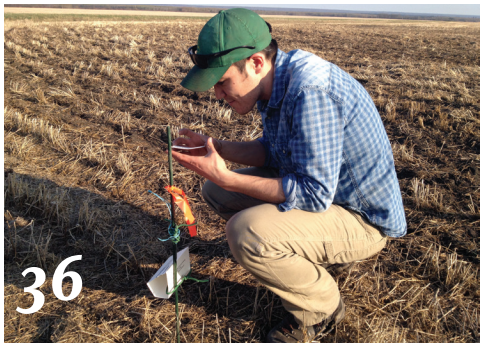
AWC Program Funding
All AWC and WCD-funded programs consolidated under AWC at a cost-saving of 9-cents per tonne to Alberta wheat producers.

Variety Development
AWC to maintain core funding for the development of new wheat varieties. AWC is committed to ensuring continuity in Canada's public wheat breeding programs.

Canadian International Grains Institute
AWC to maintain funding for the services provided by Cigi.

Learn more at albertawheat.com

/// Features ///



WHO WE ARE

Alberta Barley and the Alberta Wheat Commission co-publish *GrainsWest*, a farming quarterly dedicated to the interests of this province's grain farmers. *GrainsWest* connects farmers, food and ideas.

Jennifer Barber

Jennifer Barber is an Okotoks-based freelance agriculture communicator who has been writing about the Canadian agriculture industry for more than 20 years. She loves to tell the stories of farmers and farming from different areas of this country and from around the world.

Matt Hamill

Matt Hamill grew up on a grain farm in central Alberta. He studied at Red Deer College and holds a bachelor of business administration from Mount Royal University. In 2014 he co-founded Red Shed Malting, one of the first specialty malt houses in Western Canada.

Sarah Hoffmann

Sarah Hoffmann grew up on a seed farm in Alberta. After graduating from high school she moved west to study English literature in Vancouver. Since, she's lived north, east and south of her original starting point, where she once again finds herself growing pedigreed seed alongside her parents and writing for agriculture publications.

Tamara Leigh

Tamara Leigh is a transplanted Prairie girl living on Vancouver Island. A passionate student of agriculture and food issues, she is a contributor to Canadian farm publications and represents the B.C. Farm Writers' Association on the board of the Canadian Farm Writers' Federation.

Tiffany Sloan

As a freelance editor and writer, Tiffany Sloan's daily grind ranges from magazine journalism to corporate communications to academic curriculum editing, and her written repertoire spans just about every subject under the sun. Although transplanted from Edmonton to Vancouver at an early age, she's still a Prairie girl at heart.

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BY TREVOR BACQUE

Trade-off

WITH TPP DEAD, BILATERAL TRADE AGREEMENTS ARE CANADA'S LOGICAL NEXT STEP

Canada can't afford to do nothing while the international trade environment continues to shift all around us.

A YEAR AGO, IF ANYONE ASKED ME whom I thought would win the 2016 U.S. presidential election and whether the Trans-Pacific Partnership (TPP) would receive the green light from each of its 12 signatories, I'd be hard pressed to say anything other than "Clinton" and "yes."

Well, a lot can change in a year, can't it? Today, Donald Trump governs the U.S. and his first executive order was to kill the TPP. May I have a mulligan, please? Next up on the to-do list for America's new president is renegotiating the terms of what he has called "the worst trade deal maybe ever signed anywhere": NAFTA, or the North American Free Trade Agreement, negotiated by Brian Mulroney, George H.W. Bush and Carlos Salinas.

After fewer than 100 days of the new Republican president, Canada has been forced into a precarious position. What happened to agriculture's bright, shiny TPP deal? And if NAFTA is up for renegotiation, is any longstanding agreement between our two nations sacred? Initially, nobody thought Trump was serious, but his actions during his first months in office have proven that no ill-advised campaign promise is too outlandish for his administration to pursue.

Every single day, Canada and the U.S. trade about $1 billion in goods back and forth across our shared border. That trade is pivotal to our national economy. If we lose any sizable portion of that export market, we'll be stuck with a supply glut of countless products that will need to find a home elsewhere. We're an export-driven nation—this is no secret. We need to stop waiting around for other countries to dictate our trade fortunes, merely hoping that when the dust settles we won't be much worse off than we are right now.

With the TPP dead in the water, it's clear that the deal's signatories—Canada included—are mourning the loss of promised access to Japan's uber-premium export market. Losing out on market access in Vietnam, a nation that has grown by more than 15 million people since the turn of the millennium to a total population of 95 million, also stings. If there is an appetite for TPP to continue without the U.S., Canada should definitely jump at the chance to continue what were advanced discussions. Much of the framework is already in place and Canada wouldn't have to start from scratch to secure broad market access.

Canada can't afford to do nothing while the international trade environment continues to shift all around us. It's time to take our trade destiny into our own hands so we can protect ourselves against any further actions from our southern neighbour that might harm our interests at home and abroad.

Canada must immediately begin exploring bilateral trade agreements with our international friends, new and old. Why not start with Japan? It's a country that's already looking to make deals, so we must continue to aggressively pursue opportunities in this geographically small, but extremely large and lucrative market. With a population of 127 million, Japan's receipts total $4 billion in Canadian agri-food exports, about 10 per cent of our overall total. It is our largest canola seed market and our second-largest market for malt barley and pork. We ship healthy amounts of wheat, beef, pulses and sugar to Japan as well.

From there, we should expand our Asia-Pacific trade agenda into China. One Chinese proverb says, "The best time to plant a tree was 20 years ago. The second-best time is now." Canada can and should apply that same piece of wisdom to bolstering trade relations with Xi Jinping's administration. By 2022, China's middle class is expected to number an eye-popping 550 million. That's a crowd that will spur a rapidly growing demand for high-quality products, especially food. Canada cannot ignore an agri-food export opportunity of this magnitude.

And why stop there? We should send an envoy to Vietnam, get Malaysia's country code and start making calls. If the TPP isn't meant to be, maybe a course of action that prioritizes close, bilateral relationships with many of the doomed deal's signatories will be our new path into the uncertain future.

Here in Canada, we produce an enormous supply of quality agri-food products that make their way all around the world every year. We have more than enough to feed our own, so let's start tapping into new markets and bring greater prosperity to Canada's farmers and general population.

CORRECTION NOTICE

In our January 2017 issue, Clair Langlois was misidentified in a story as a current Certified Crop Adviser. Langlois was a CCA between November 1997 and September 2000 while working in Eastern Canada.

BY ANDREA HILDERMAN

SEA COWS

SEAWEED IN CATTLE DIETS CAN REDUCE METHANE EMMISSIONS

Photo: Rob Kinley

Former Dalhousie University researcher Rob Kinley has been able to achieve sizable reductions in methane emissions from cattle by including seaweed in their diets.

CATTLE AND OTHER RUMINANT animals produce methane gas when they burp and fart, and, unfortunately, they burp and fart a lot. This methane represents about 16 per cent of global greenhouse gas emissions, based on Intergovernmental Panel on Climate Change (IPCC) data from 2010. The IPCC also found that agriculture, forestry and other land use accounts for 24 per cent of global gas emissions, mainly from crop cultivation, livestock and deforestation. Among the greenhouse gases, methane is one of the most concerning due to its effectiveness at trapping heat in the atmosphere—it's 20 times better at trapping heat than CO_2.

Confronted with this problem, researchers around the world have been seeking ways to reduce the amount of methane produced by ruminant livestock. Thankfully, a potential breakthrough occurred right here in Canada, in the form of a discovery by Prince Edward Island dairy farmer Joe Dorgan and former Dalhousie University researcher Rob Kinley.

"A farmer in P.E.I. gave his cows access to seaweed on beaches adjacent to his fields," said Kinley. "He noticed that the cows that ate the seaweed had increased reproductive success, reduced mastitis and improved immunological health. So, naturally, as a good herdsman, he started feeding all his other cows seaweed. They caught up health-wise with the others, and he also noticed his herd was happier and more docile."

Around 2006, Dorgan decided he wanted to produce a mineral supplement extracted from the seaweed for the organic cattle feed market. In order to satisfy Canadian Food Inspection Agency animal feed regulations, Kinley conducted a series of tests in 2008 on Dorgan's seaweed feed mixture.

Kinley had the quintessential "aha moment" when he discovered that methane emissions were reduced by 20 per cent in the cows that ate seaweed. His important discovery led him to Queensland, Australia, in 2013, where he continued his research with the Commonwealth Scientific and Industrial Research Organization, in collaboration with Meat and Livestock Australia and James Cook University. There, they found a species of seaweed that reduced methane production to zero in the lab.

"These were relatively poor samples we were using at the time," said Kinley. "Seaweed is not readily available like common feed ingredients. Our next trials were planned using freshly freeze-dried product that was three times as potent."

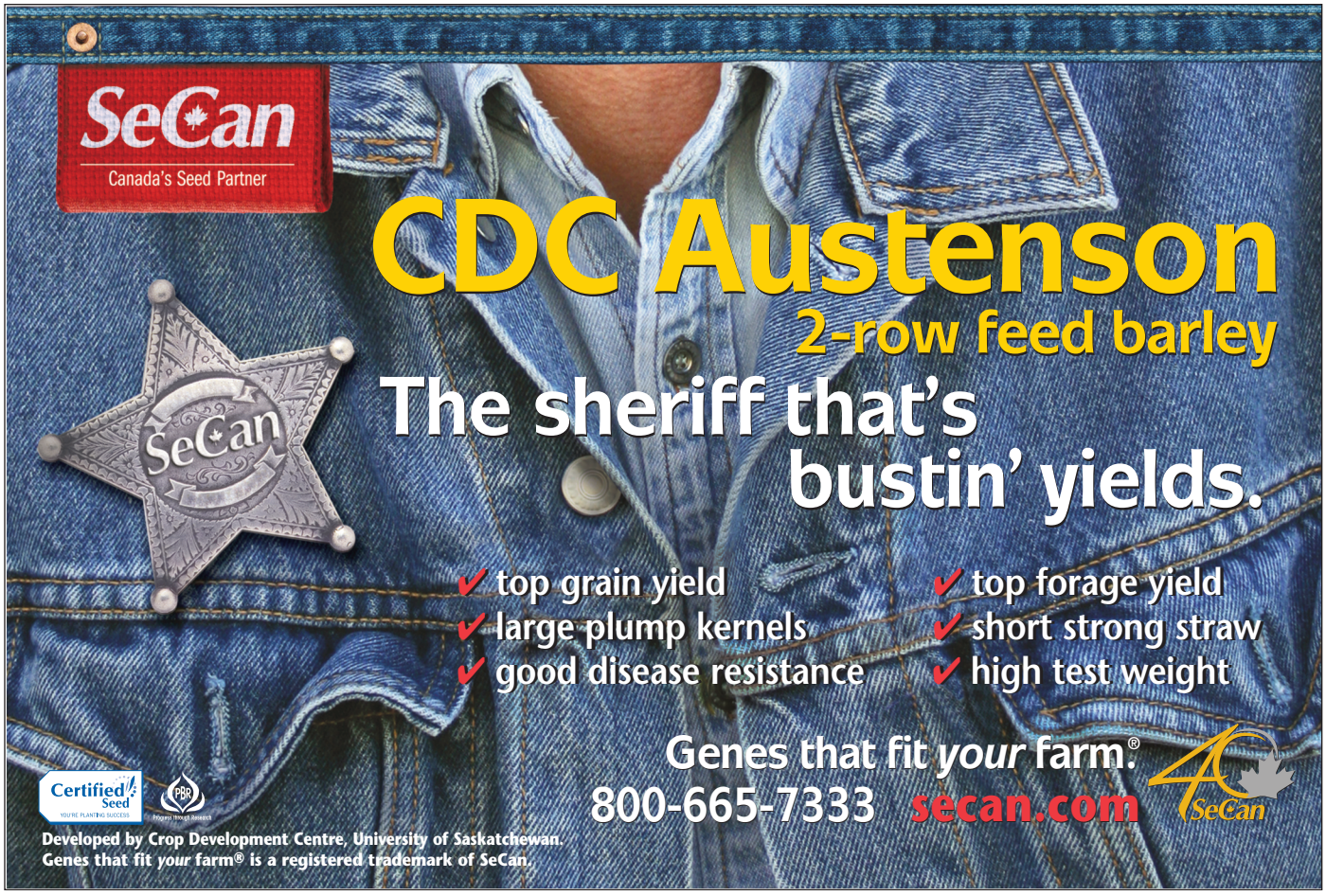
Eventually, Kinley achieved methane reductions of 85 per cent over time in sheep, with seaweed inclusion rates of less than two per cent of their diets.

There are two significant barriers to the successful use of seaweed in the commercial cattle herd: the level of inclusion (too much seaweed and the cows might not eat it) and availability of supply. The first problem seems manageable, given the emissions reduction Kinley achieved with low inclusion rates for sheep, and a solution to the second problem might also be within reach.

"In Ireland, we found Ocean Harvest Technology, a company that is already producing a variety of seaweed bioactive ingredients designed to replace synthetic ingredients in various ag and aquaculture feed mixes," said Kinley. "They will be working with us on the next step of this incredible journey—the on-farm dairy trial, which we will be conducting in Ireland for convenience."

Growing sufficient quantities of the seaweed required will be a big challenge, but doing so could have a positive impact on more than just methane emissions.

"Not surprising to me, after everything we've discovered so far, is that growing seaweed in volume appears to have very positive benefits on the ocean itself," said Kinley. "Seaweeds clean the ocean they are grown in, reducing acidity by reducing CO_2 levels, and provide habitat for marine life. This might be the second great contribution these algae can make—as well as providing the means for us to reduce methane emissions by cattle, thus reducing greenhouse gas emissions and slowing global warming, seaweed will also help improve the health and quality of our oceans."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BY JENNIFER BARBER

FRESH START

ORGANIZATIONS MATCH REFUGEES AND NEWCOMERS WITH AGRICULTURE JOBS

Photo: Calgary Catholic Immigration Society

For many newcomers to Canada, jobs in the Alberta agriculture industry are a perfect fit.

A RECENT CANADIAN SENATE report found that, one year after arriving in Canada, half of eligible Syrian refugees remain out of work. While there are many reasons why refugees would experience difficulties joining the Canadian workforce, two projects are looking at ways to help match refugees and other newcomers with employment in the severely understaffed agriculture industry.

"We saw a large influx of refugees from Syria last year, and at least 45 per cent of that population had rural backgrounds," said Anila Lee Yuen, CEO of the Centre for Newcomers in Calgary. "When we spoke to them about the possibility of returning to agriculture, most of those people were willing to consider agriculture as a potential career."

A three-year labour market research study by the Canadian Agricultural Human Resource Council (CAHRC) found that the labour gap for the agriculture industry in Canada doubled over the past 10 years, and now stands at approximately 60,000 open positions. That number is expected to double again by 2025.

"This gap is particularly evident in grains and oilseeds production," said Debra Hauer, a project manager with CAHRC. "In that sector alone we have 7,500 vacant positions resulting in $560 million in lost sales. Historically, producers have had several ways to find seasonal workers, but it has become increasingly difficult to fill permanent positions."

The Centre for Newcomers is developing a bridge program to help Syrian refugees and other immigrants find year-round, permanent work in agriculture, allowing them to move their families and settle into rural communities. With a spring 2017 target date in mind, they are in talks with various groups to help create a program that makes careers in agriculture and country living a viable option.

"We are working with post-secondary institutions and agricultural industry groups to develop a formalized process to get these people to work," said Lee Yuen. "This bridge program will offer training to give refugees access to the labour market by reintroducing them to agriculture in a Canadian context. We are talking with employers to establish practicums so that people can get the skills needed for full-time employment within the industry."

In 2016, the Calgary Catholic Immigration Society partnered with CAHRC on a pilot project to match refugee and immigrant job seekers with employment in agriculture. They introduced 207 recent newcomers and refugees from 13 different cultural groups to job opportunities in farming, and close to 50 of them subsequently secured jobs in the industry.

"We first looked at the barriers to employment in the agriculture sector," said Hauer. "We found it was important to engage employment agencies in rural areas, as agriculture employers had not often used these agencies in the past. We've also had a very high success rate matching immigrants and refugees with agricultural jobs when we have made sure we had community support."

While language differences are an issue for recent arrivals, those with moderate English or French language skills are often able to make a quick transition. "In September we had 46 new refugees from Eritrea arrive, looking to settle in Alberta," said Fariborz Birjandian, CEO of the Calgary Catholic Immigration Society. "Because we had previously established a relationship with the JBS plant in Brooks, as well as within the community itself, they were all living and working in Brooks within six weeks of arriving in the province."

Birjandian said the Society is currently focused on communities within 150 kilometres of Calgary in order to offer refugees and immigrants access to services that are generally only available in the city, such as some language programs, while still helping their families get settled in new towns.

"We have been developing community partnerships over the past 20 years to move people where there are available jobs," he said. "However, we find if we can get people to move before they've made social connections, we have a greater success of integrating them into the community. I see this pilot project as the beginning of a long-term relationship that identifies needed skill sets within the agricultural sector, and matches qualified and interested new arrivals for this sector."

BY KARIN OLAFSON

STEPPING TOWARD SUSTAINABILITY

NATIONAL ENVIRONMENTAL FARM PLAN IS ON THE HORIZON

FARM ORGANIZATIONS, BUYERS and governments from across Canada came together in Ottawa at the beginning of November last year to discuss one thing: the formation of a National Environmental Farm Plan (NEFP). According to Erin Gowriluk, government relations and policy manager for the Alberta Wheat Commission and chair of November's summit, there is strong support for the concept of a national program—94 per cent of surveyed participants see value in a national environmental farm plan program now and into the future—and its development is already underway.

Environmental farm plans (EFPs) aren't new. The first EFP was in Ontario and it rolled out in 1993, while the EFP in Alberta started in 2003. But the ones that currently exist are all provincial, rather than national.

Paul Watson works for the Agricultural Research and Extension Council of Alberta and is the director of the Alberta EFP. He's also the interim chair of the NEFP Steering Committee. He describes EFPs as voluntary, whole-farm environmental risk self-assessments that are done by producers. Regardless of which provincial EFP a producer is working with, the goal is sustainable farming. A national program will harmonize the various provincial programs.

A harmonized national program will also take into account how varied farming is in Canada. "That's critical," said Gowriluk. "This is not a one-size-fits-all solution in Canada."

According to Watson, the two main reasons a national plan is in the works now are to provide a simple sustainability solution to producers and to provide consistency.

"Buyers want to be able to tell people in the outside world specifically what a farm plan means. An NEFP will mean that there is a Canadian industry-defined minimum standard," said Watson. "It doesn't matter if you're in the Yukon or Quebec or British Columbia or elsewhere in Canada. If you've done a farm plan, then you've met a base standard—and we're currently working on defining that national base standard."

In November, agriculture industry stakeholders from across the country gathered in Ottawa for the first National Environmental Farm Plan Summit.

In a nutshell, this is all because sustainable farming matters now more than ever to consumers—a fact that hasn't been lost on the companies buying agricultural products. "The demand [from buyers] for sustainably sourced products has been increasing over the past six years and will certainly continue to increase further," said Watson.

With a national program, buyers will be supplied with ample data to prove to their customers that they are supporting their sustainable sourcing claims. Simply, one of the goals of the NEFP is to demonstrate that farmers are meeting buyers' environmental objectives.

Gowriluk said that if provincial EFPs aren't harmonized into a national solution, then buyers are going to come to producers with their own set of requirements, which isn't ideal. "EFPs are made by producers, for producers, and EFPs are already recognized and trusted by farmers," said Gowriluk. "A new program would be a major uphill battle for companies in terms of farmer uptake."

Consider that 35 per cent of Canadian producers have completed an EFP, covering 50 per cent of the arable land in Canada. Based on that, companies can see that farmers and ranchers are already on board with the EFP concept.

Progress on the NEFP continues, and the program should be up and running by 2018. Once the national program is launched, participating producers will be well positioned to meet international market requirements.

"Farmers are already doing a lot of good things when it comes to sustainability," said Watson. "If we can capture exactly [what they're doing], I think Canada will become a preferred supplier in world markets. We just have to be able to tell the buyers our sustainable growing story."

BY SARAH HOFFMANN

A NEW KING OF BARLEYS

THE MALT LANDSCAPE IS CHANGING—ALBEIT SLOWLY

THERE ARE NO SHORTCUTS TO the top of the malting barley heap. More than 15 years after becoming a registered variety, CDC Copeland has become the most widely grown malting barley variety in Western Canada, pushing stalwart AC Metcalfe into second place.

"Copeland is turning into the king," said Kevin Sich, grain department manager at Rahr Malting in Alix, AB. He noted that the variety is well suited for both the North American craft brewing industry and offshore beer makers.

CDC Copeland represented 44.7 per cent of the acres seeded to malt barley in Western Canada and AC Metcalfe totalled 34.2 per cent. Both of these two-row varieties remain firmly planted at the top of the Canadian Malting Barley Technical Centre's (CMBTC) recommended malt varieties list for the 2017/18 crop year.

Although the new list looks similar to last year's, growers will note that the CMBTC removed CDC Meredith and Merit 57 this year. "We didn't feel there was a strong enough marketplace for CDC Meredith and Merit 57 to merit being on the recommended list this year," said Peter Watts, the CMBTC's managing director.

AAC Synergy switched categories from "under commercial market development" to "growing demand," signifying greater uptake by the malting and brewing industry. Sich called AAC Synergy the "rookie of the year." North American craft brewers like its malting profile, which resembles CDC Copeland, and farmers like the variety's improved standability.

"The last big frontier for Synergy is an off-shore market," said Sich. "If it could become an offshore variety, then it could become really big." AAC Synergy was the third most widely grown variety on the Prairies, increasing from less than one per cent of seeded acres in 2015 to just over five per cent in 2016.

Photo: Sabrina McAllister

CDC Copeland now reigns supreme in Western Canada, according to the Canadian Malting Barley Technical Centre's 2017/18 recommended varieties list.

Wade McAllister of Antler Valley Farm grew 200 acres of AAC Synergy barley last year—about 15 per cent of the total malting barley acres on his Innisfail-area farm. He said AAC Synergy showed improved yield and standability over CDC Copeland, the main malt variety he grows.

"We love Copeland because it's a high-producing variety that everyone wants," said McAllister, adding that "it would be nice to have [another variety] that you could put into the rotation that has similar characteristics."

McAllister called malt the "No. 1 priority" on his farm. "We put everything we have into our malt. It can outperform our canola on dollars per acre," he said. The effort paid off for Antler Valley Farm this year, as 100 per cent of its barley was accepted for malt.

The relatively high level of malting barley quality across the Prairies suggests that many farmers had the same philosophy as the McAllisters this year. According to the annual *Quality of Western Canadian Malting Barley* report produced by the CMBTC and the Canadian Grain Commission, the average protein content of barley selected for malting in 2016 was lower than in 2015 and lower than the 10-year average, while the average thousand-kernel weight and plumpness was higher than the 10-year average. These specifications—low protein and high kernel weight and plumpness—are exactly what maltsters are looking for when sourcing barley.

Despite challenging harvest weather across parts of Alberta and Saskatchewan, Sich said farmers were fortunate that there was no hard frost before the middle of September. He believes farmers focused on timely harvesting of malting barley because of the large spread between feed and malt prices.

"This was the first year that guys chased malt over wheat," said Sich. "We got off a lot of good-quality barley because guys were motivated by price."

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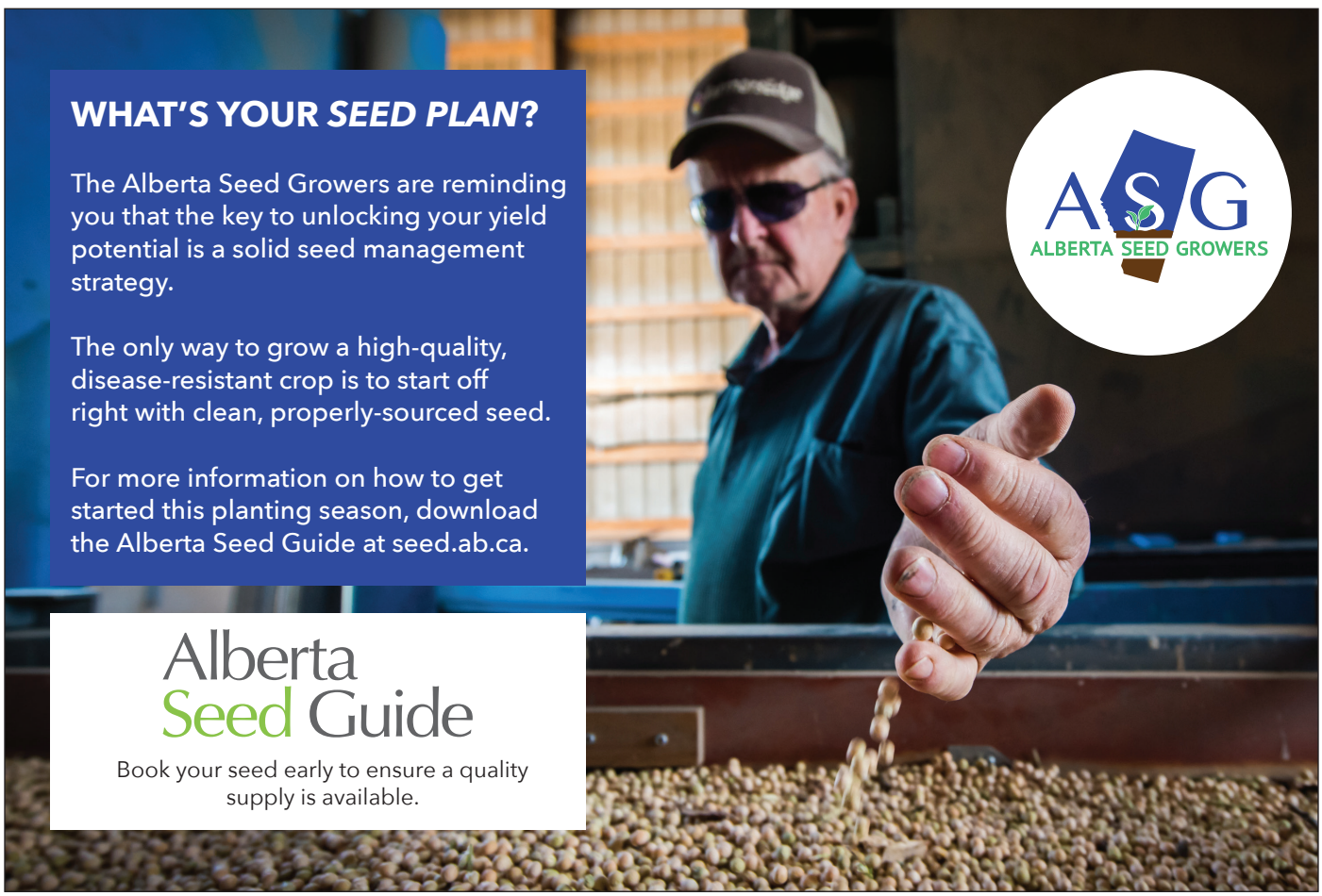

WHAT'S YOUR *SEED PLAN*?

The Alberta Seed Growers are reminding you that the key to unlocking your yield potential is a solid seed management strategy.

The only way to grow a high-quality, disease-resistant crop is to start off right with clean, properly-sourced seed.

For more information on how to get started this planting season, download the Alberta Seed Guide at seed.ab.ca.

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ALBERTA SEED GROWERS

Alberta Seed Guide

Book your seed early to ensure a quality supply is available.

BY GRIFFIN ELLIOT

BACK TO THE FUTURE

CATCH A GLIMPSE OF WHAT THE FUTURE OF FARMING HOLDS

THE FIRST EVER FUTUREFARM Canada Expo, organized by dmg events in partnership with the historic Olds College, will be held this July.

"We had a vision to try and develop something new for central Alberta that focused on the future of farming," said Wes Scott, executive vice-president at dmg events.

According to Scott, the trade show will use Olds College's unique facilities—which are equipped for everything from meat packing to brewing to growing crops for exhibitor demonstrations—to dissect the future of farming, while taking aim at innovation, precision and the new generation of young farmers who will be the mainstays of Canadian agriculture for many years to come.

"Having it out at Olds College gives us an opportunity to add a lot of educational elements and focus on that millennial farmer," he said.

Scott added that, as an added bonus, the partnership with Olds College and the show's summer timing make it possible for exhibitors and visitors to stay in student accommodations at the college for a reasonable price.

Olds College president Tom Thompson was quick to get onboard with the idea for the FutureFarm Canada Expo, Scott said. "They have a lot of the infrastructure and facilities that we needed and an appetite to deliver that educational content, and we're a large event organizer that's accustomed to organizing large-scale events. So it was a bit of a marriage made in heaven."

Tanya McDonald, vice-president of advancement at Olds College, shared Scott's sentiment that the partnership between the college and dmg events made perfect sense, and expressed her hope that the show will be more than a one-time event.

"The opportunity here at Olds College is really that whole farm-to-fork approach—we can showcase production right through to the process and the enjoyment of the food experience," McDonald said. "We're really excited about how it connects with our current programs and how we can integrate students over the long run in enjoying and learning and participating in this event, which will hopefully become an annual event."

Photo: Olds College

The first FutureFarm Canada Expo will make the most of Olds College's unique facilities to maximize value for attendees.

The FutureFarm Canada Expo is scheduled for July 6 to 8, overlapping with the first few days of the Calgary Stampede, but the organizers are hoping that the timing will actually work out in their favour.

"We always wanted to be close to the Calgary Stampede because we felt there was an opportunity to work with their International Agriculture and Agri-Food Committee to host a number of international groups at the Calgary Stampede," Scott said. "The idea that we can work with that group to bring delegations into Olds so that they can meet with farm producers from Alberta, as well as see some of the different innovation being developed in agriculture, seemed to be a win-win for us.

"Then reversing that, we saw great opportunities for people that are coming from outside of town to actually stay at the venue," he added. "They can even bring their campers in to stay at the campsite and then we can put the families on buses and take them to the Calgary Stampede so they can have a bit of a family getaway, as well as attending FutureFarm Canada."

BY MELANIE EPP

FULL STEAM AHEAD

GRAIN TRANSPORTATION POLICY CHANGES ARE ON THE WAY

ON NOV. 3, 2016, TRANSPORT Minister Marc Garneau announced the federal government's Transportation 2030 plan, which will include new legislation that will address several priority areas for grain transportation. Industry stakeholders have been pushing for these measures for a long time.

"Grain transportation is of the utmost importance to our industry," said Shannon Sereda, market development and policy manager at Alberta Barley. "Developing outside markets has no importance if we can't get our grain there, particularly for Western Canada. We are looking for an accountable and demand-driven rail system."

Sereda is a member of Team Alberta, a small group responsible for the lobbying work that took place leading up to the federal government's announcement. That effort included everything from one-on-one time with key ministers to a letter-writing campaign, to the launch of a quarterly newsletter to educate MPs on the importance of a fair and balanced service. Those efforts have been rewarded with the federal government's recent announcement that it would introduce legislation to advance a long-term agenda for a more transparent, balanced and efficient rail system this spring.

Wade Sobkowich, executive director for the Western Grain Elevator Association, is happy with the announcement, even if the details of what will be included in the new legislation remain a bit hazy. "Exactly what it means, we're not 100 per cent sure," he said. "The most specific promise of those is the one on reciprocal penalties and the idea that reciprocal penalties will be included in service-level agreements in the legislation."

Jeff Nielsen, president of the Grain Growers of Canada, said the promise of reciprocal penalties is a step in the right direction. "Prior to this new legislation it was 'too bad,'" he said. "We hope with the reciprocal penalties that we'll see better rail performance."

Photo: iStock Photo

The federal government has promised that new grain transportation legislation will include reciprocal penalties in an effort to improve rail performance.

Tom Steve, general manager of the Alberta Wheat Commission, agreed that reciprocal penalties are key to any new legislation. "Reciprocal penalties in service-level agreements will enable grain shippers to hold railways accountable to contract terms that you would expect from a normal competitive commercial agreement," he said.

The announcement also promised a better definition of "adequate and suitable" service in the Canada Transportation Act, and to improve timelines for decisions.

"If Canada is to grow its economy, then we need to have a definition of adequate and suitable accommodation that is rooted in shipper demand," said Sobkowich. "Because we can't have a definition of adequate and suitable that's based on the amount of rail cars and locomotives and crews the railways choose to put out there. We can't have a supply-based definition of adequate and suitable."

The government also announced that it would address the future of extended interswitching limits and the maximum revenue entitlement (MRE). While Nielsen agreed that the MRE needs to be addressed, he said the bigger problem is that hopper car fleets are at the end of their life expectancy and need to be replaced. The new cars, he said, are lighter, shorter and carry more grain. "Overall, we're just very happy that we've seen the government move this far," he added.

"At the end of the day," said a more cautious Sobkowich, "we just want the service and we want reasonable rates."

For now, Sereda and the rest of Team Alberta will continue their work to advance policy on behalf of Alberta's crop sector.

"We're at the point where we're just waiting to see what's going to happen," she said. "While the announcement is exciting, there are still a lot of details that need to be ironed out."

BY LEE HART

SNOWED UNDER

UNHARVESTED CROP IS A MESS ON MANY LEVELS

JODY KLASSEN IS ONE OF MANY farmers across central and northern Alberta who really don't see a happy ending for the story that played out late in 2016, leaving more than one million acres of grain and oilseed crops left unharvested under snow. All he can do is make the best of a bad situation.

Klassen, who farms at Mayerthorpe, northwest of Edmonton, has about 12 per cent of his crop still out in the field. He knows many farmers are in a worse position than him, with 30, 40 or even 70 per cent of their crop still out in the field after being caught by an early-October snowfall. Damage figures are still being tallied, but province-wide losses are expected to be in the tens of millions of dollars.

After the snow fell and the weather improved, Klassen did manage to harvest another 2,000 acres in November, but his efforts were eventually shut down again by more winter weather, leaving about 500 acres of canola and 140 acres of wheat unharvested for the rest of the winter.

"I really don't know what to expect when we are able to get out there and get this off in the spring," Klassen said. "I've farmed most of my life and we've always finished harvest in fall, for more than 40 years."

Everything unharvested on the Klassen farm is under snow. He was planning to straight-cut the remaining crop, but as of late January it "was neither standing nor swathed—it was just flat."

Klassen is hoping he can recoup about 80 per cent of the crop value that's still out there, but only time will tell whether that will actually be possible. "For those farmers affected, we really need the grain companies to work with us on this," he said. "We need to recover whatever value we can."

According to Harry Brook, a longtime crop specialist with Alberta Agriculture and Forestry, any standing crop that's gone down will be extremely difficult to pick up, and any swathed crops won't be much better. Freeze-and-thaw cycles over the course of the winter could cause grain kernels to sprout, and mice and voles under the snow will be eating and defecating on crop. There could also be losses from larger wildlife foraging on grain.

Photo: iStock Photo

The 2016 harvest still weighs heavily on many Alberta farmers who were unable to get their entire crop off before the winter.

"Some of our specialists here estimate canola left out over winter could lose 50 per cent of its yield and 50 per cent of its quality," Brook said. "In some areas through central and northern Alberta, right up into the Peace River region, there is 30 to 40 per cent and perhaps more of the crop still out, so this is a devastating situation."

Zsuzsanna Sangster, an insurance solutions specialist with Agriculture Financial Services Corporation (AFSC), said her company has been doing all it can to process more than 2,000 unharvested crop insurance claims affecting more than one million acres.

The company's team of on-farm inspectors was strengthened in December to begin the damage assessment process. As of Feb. 1, 2017, AFSC had paid out benefits on about 45 per cent of the unharvested claims.

"We're still in the process, but so far losses are totalling about $17.5 million," Sangster said. "This is not a common situation. The last time we had crop losses of this scale was in 2004."

Once AFSC inspectors have made their on-farm assessments, claimants may be eligible for interim or partial crop loss insurance payments. Once the unharvested crop is harvested, the rest of the payment will be made based on final yield and quality.

"If there are any producers who don't plan to actually harvest crop that's still out there—say, if they plan to bale wheat and use it for feed or straw, for example—we need to know that too," Sangster said. "If they decide to do something else with the crop other than harvest, then we can determine a final insurance amount."

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Person: Lewis Baarda

Place: Lethbridge, AB

Thing: Collecting field map data to improve farm productivity

Data miner

Maps, tests, yields and inputs—Lewis Baarda crunches layers of information into useful, usable knowledge for the farm level

BY LYNDSEY SMITH • PHOTOGRAPHY BY CHRIS YAUCK

LEWIS BAARDA WASN'T SURE EXACTLY WHAT HE WANTED TO DO FOR A CAREER, BUT HE KNEW HE WANTED TO work outside. Combined with a fascination with maps and a knack for numbers, Baarda soon found his way into studying geographical information systems (GIS) at the University of Lethbridge. After receiving his bachelor's and master's degrees there, he moved on to a position with Farming Smarter in southern Alberta.

The Farming Smarter Association is a not-for-profit group conducting innovative and relevant applied research for its members. From variable-rate technology to crop hail recovery, to hemp and grain agronomy, and even precision planting, Farming Smarter tackles fascinating, timely agricultural research.

Baarda started with Farming Smarter three years ago as a GIS analyst, and recently moved into directing on-farm research.

GrainsWest: **What, exactly, is GIS?**
Lewis Baarda: At its core, GIS is essentially interactive mapping software. GIS software allows us to combine maps so that we can examine the relationship between different mapped variables, such as soil type, yield or applied inputs.

We can bring in many maps, or layers, to examine and quantify relationships between various variables. It is a powerful tool for understanding the variability in our fields, and complex spatial relationships between yield and various factors of production.

GW: **That sounds really computer-centric. How does it fit into growing a crop?**
LB: GIS fits into the world of precision agriculture. It is used to examine relationships between different soil properties. The idea behind GIS in agriculture is that if we can understand how soil properties and crop yields vary from one end of a field to another, we can perhaps address specific crop needs in specific regions of the field.

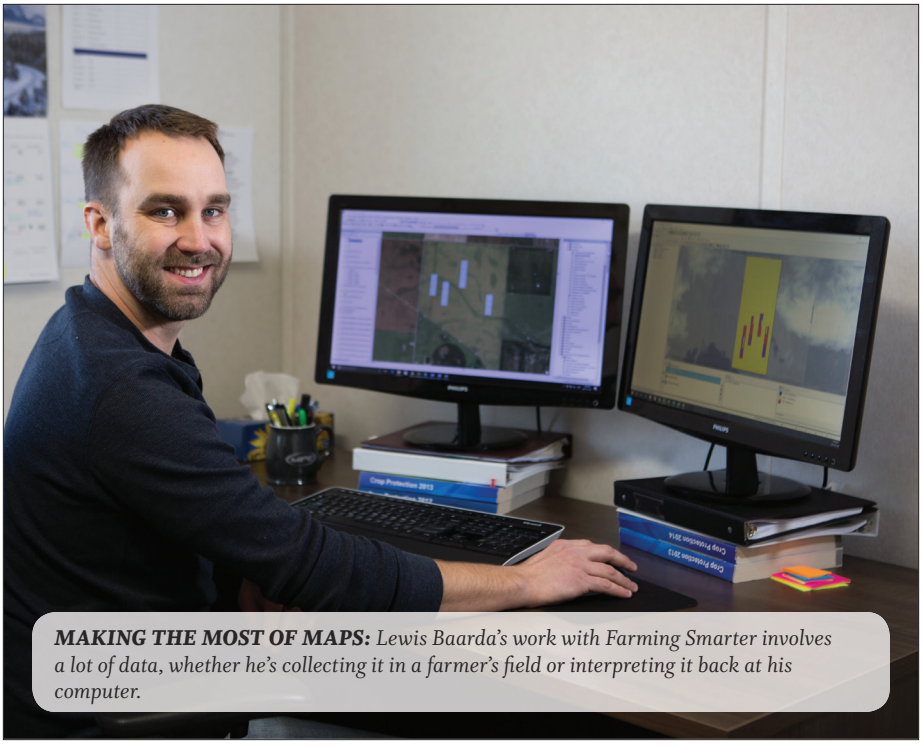
GW: **What is your role at Farming Smarter?**
LB: When I was hired, Farming Smarter was just getting started on an ambitious project investigating soil sensors and variable-rate technology. At the beginning, my focus was almost exclusively on that project. This meant travelling to a number of fields across the province, collecting data and implementing on-farm research trials. Once the growing season is over, I hunker down in front of my computer and try to make sense of all the data that was collected.

GIS analysis is just one part of a broader scope of my responsibilities, including on-farm research and precision agriculture. This means working with farmers to set up research trials in their fields, using their equipment and existing precision agriculture tools. My job is to ensure trials are set up and implemented correctly. I visit fields throughout the growing season to monitor, observe and collect data. I help to co-ordinate harvest to ensure accurate data are collected, then analyze and summarize that data to produce trial results.

When I am not busy with on-farm trials in the summer, I manage a few of Farming Smarter's nearly 100 small-plot research trials. It is a busy and dynamic environment here, so there is always something to do.

GW: **What is a typical day like for you in the busy season?**
LB: I'm not sure there is such thing as a typical day working in agriculture, even on the research side of things.

Seeding and harvest are the busiest times of the year for



MAKING THE MOST OF MAPS: *Lewis Baarda's work with Farming Smarter involves a lot of data, whether he's collecting it in a farmer's field or interpreting it back at his computer.*

me. For the last few years, I have had a number of on-farm trials on the go. Each trial is quite manageable on its own, but seeding and harvest time really put the pressure on. Spring tends to be the worst. I can go weeks waiting to seed, and then—boom—one day three producers will let me know that they will be seeding a trial in the next 24 hours. I maintain close contact, knowing that in spite of all the preparation something will inevitably go wrong, and of course it does. Usually, it is a last-minute technological hurdle. Sometimes the seeding prescription file I wrote isn't recognized by the farmer's equipment. Sometimes the software in the tractor refuses to communicate with the hardware in the equipment. Once there was a single wire that had worn through, rendering the equipment incapable of receiving the information necessary to carry out a trial. Through experience, a lot of these wrinkles have been ironed out, but we still have the occasional springtime train wreck.

The GIS work and data analysis component of my job is probably the most challenging, but this work is typically done in the off-season when fieldwork is complete, so I have the luxury of time to work through any issues that may present themselves.

***GW*: What's your favourite part of this job?**
LB: I love the days I spend outdoors. I love being able to head out to a real field somewhere and just spend a day in the sun collecting data. And as much as seeding and harvest time can be intense, being able to ride along while a crop is being seeded or harvested and getting to BS with the farmer—it's really a lot of fun.

***GW*: What has been one of your biggest frustrations working in this field?**
LB: Data overload. With the data collection tools at our disposal and the capacity to gather data quickly, easily and cheaply, we tend to collect a lot more than we need or can use. Sifting through all this data and separating the real, usable information from the noise can be a real challenge. I will struggle for a long time to fit a certain data layer into the puzzle, only to conclude that it just doesn't fit, or that it isn't relevant. Sometimes, too much data can take me on wild tangents, chasing interesting—but ultimately inconsequential—patterns.

***GW*: What do you see happening in five, 10 or 15 years, in terms of applications for this technology?**
LB: That's a tough question to answer. With the tools of precision agriculture, and the data-processing capacity of GIS technology, there is real potential for innovation. However, before we get there, we need to be honest about what we do and do not know, and about what we can and cannot do. I spend a lot of time working to understand spatial variation of soil, moisture and yield in a field, but there are important temporal variations in weather that really make it difficult to predict how a crop will behave in a given year.

It may not be possible, but if somebody can figure out how to accurately predict the weather, and I mean months in advance and at a regional scale, this technology would really take off. Weather variability really undermines our ability to predict crop behaviour, and thus our ability to precisely manage inputs to crop productions.

The big answer for 10 to 15 years from now is making certain farm tasks autonomous, such as giving farmers the capacity to scout fields remotely with unmanned vehicles and developing robots that can recognize and terminate harmful plants or insects as they appear.

***GW*: What's the one thing you wish more farmers knew or applied about GIS technology?**
LB: When it comes to the world of precision agriculture and big data, I think GIS is like a black box that spits out information, but nobody is entirely sure what is going on inside. The truth is, there is no perfect algorithm that can tell farmers exactly how to understand and manage variability in their fields. GIS and precision agriculture are tools—powerful tools—that can help to better understand our land and production, and can support management decisions, but they need to be married to good agronomy to be effective.

BY JON DRIEDGER

Bouncing back

BRUTAL 2016 HARVEST CONDITIONS CAN AFFECT 2017 CROP MARKETING PLANS

LAST FALL'S HARVEST WAS BRUTAL for the majority of Prairie farmers. Many growers have crop still unharvested and fieldwork left undone, yet are facing saturated, frozen ground in their fields. Hopefully, the spring will be early and dry, which might allow for some catching up and timely seeding. But, of course, that's not a guarantee, and a late and wet spring would only make the situation worse.

In a normal year (if there is such a thing), farms would be planning sales for fall 2017, as they anticipate the need to move grain during harvest. Most operations have to move at least some crop in the fall, and it's usually advisable to book these sales in advance rather than putting yourself at the mercy of the spot market at a time when prices tend to come under seasonal pressure. Given the circumstances, many growers are understandably cautious about making any forward sales.

How can growers manage this additional layer of uncertainty for the 2017 season? There is no magic bullet that will solve the problem, but there are some things to consider in making the right decision for your farm.

Whenever producers make new crop-selling decisions, they are essentially trading one risk for another. Specifically, the price risk is removed when value is locked in. That being said, production risk is taken on in the event that the crop is unable to be delivered. By not making a sale, producers carry price risk, but don't have to worry about a production shortfall.

It's not always easy to navigate this trade-off. When prices are very attractive, the risk of a decline is higher than when values are lower, which in turn may make it worth taking on some production risk on a portion of the crop. Finally, every farm has varying comfort levels as to how much crop, if any, they are willing to forward sell.

In some ways, we can view the current circumstances as having moved the risk trade-off down the scale to where the risk of not being able to deliver on a forward sale is higher. This may raise the bar to where we are prepared to make a commitment (i.e., where a higher price is needed to make it worthwhile to lock in values and take on the potential risk of coming up short on production).

Does this mean that growers should abandon the idea of locking in prices for fall delivery until the crop is safely in the ground? Definitely not, although our approach and the tools that we use may need to be tweaked.

First and most important, regardless of the circumstances, growers need a sound understanding of the fundamentals for each crop as well as the factors that will drive prices going forward. After all, how can one determine what is a "good" value and fairly assess the risk/reward trade-offs between price and production risk if we don't understand the underlying market dynamics? This is even more important when the production risk is magnified.

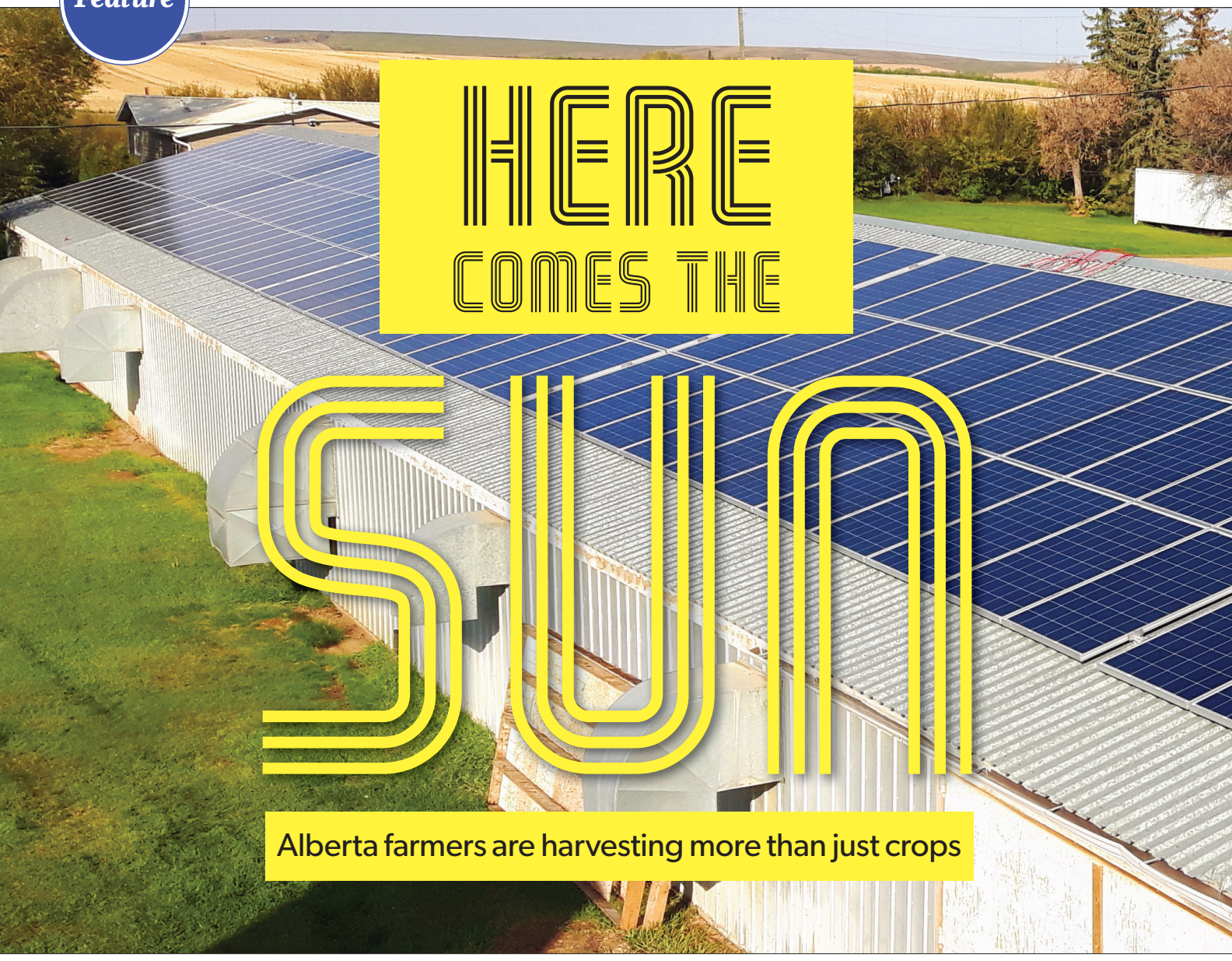
Second, think about pricing contracts that incorporate some protection for production risk. Some contracts include an "act of God" clause. This might require accepting a lower price than you would if you were making a sale without the clause, but perhaps that trade-off is worth it.

In the case of a crop like wheat, selling a lower base grade may reduce some of the quality risk. Many contracts will pay you the premium if you grow a higher-quality grade. If not, then perhaps you can buy some lower-quality wheat to fill that contract, while marketing your better sample into a higher-value outlet.

Third, consider the use of put options on futures contracts. These tools allow growers to protect downside price risk without creating any obligations for their production, while still leaving the entire price upside open. These contracts are also very flexible.

The cloud of the 2016 harvest continues to hang over many growers as we begin planting this spring. Even though it might make certain marketing decisions more difficult, we can't afford to sit on our hands and hope the price side of the equation works for the best. Instead, take advantage of the tools and strategies that are available when opportunities do arise, and then recalibrate as needed. Last but not least, pray for favourable spring weather.

Jon Driedger is a senior market analyst with FarmLink Marketing Solutions.



HERE COMES THE SUN

Alberta farmers are harvesting more than just crops

BY TYLER DIFLEY • IMAGES COURTESY OF SKYFIRE ENERGY AND KENTON ZIEGLER

AS THE WORLD HAS STARTED to grapple with the short- and long-term consequences of burning fossil fuels, renewable energy sources have become all the rage. This has spurred researchers all around the world to try to find the next big energy breakthrough that will power human civilization for generations to come.

Among these renewables, one in particular has hogged the spotlight in recent months: solar. As Tesla Motors CEO Elon Musk is revealing his company's innovative solar roof tiles and the world's first solar road is opening in France, the humble solar panel is also slowly catching on with farmers right here in Alberta. Crops like wheat, barley, canola and peas harness the energy of the sun to fuel their growth, and farmers can now do the same—with a little help from some high-tech equipment.

Surprisingly, when you combine this cutting-edge technology with one of the oldest professions on the planet, you get a perfect match. Farmers have long been early adopters of new technology, always looking for the latest innovation that can give their operation

an edge. Solar power generation has been no exception, especially in an environment where farmers are constantly looking for ways to save money while also becoming more sustainable long term.

According to David Vonesch, COO and partner with Alberta solar provider SkyFire Energy, 40 to 50 per cent of his company's customers in the past year have been farmers. One of those customers was Alberta Barley delegate and Beiseker-area farmer Kenton Ziegler.

"It was something I've always been interested in," Ziegler said. "Seven years ago, when we built our farm, I oriented my buildings in anticipation of putting solar panels on them.

"It's not something where I just said, 'let's do this.' It's about trying to be more sustainable on our farming operation."

SkyFire Energy installed Ziegler's 13.26kW solar photovoltaic (PV) system, which is made up of 51 roof-mounted panels, and it became operational on July 1, 2016.

"One of the highlights of my summer was watching that power meter run backward for the first time," Ziegler said. "That was really cool."

SUNNY WAYS

There are many reasons why solar technology has been a great fit for many Alberta farmers. First of all, thinking long term is never a problem in agriculture—it comes with the territory. As a result, farmers who invest in solar are rarely worried about waiting several years down the road before their sunk costs start paying dividends.

"Generally, agricultural customers are used to longer-term investments, having made them in land or machinery quite

commonly," Vonesch said. "Also, they're typically not going anywhere. They plan to be on their land for a long period of time and often over multiple generations."

Solar is uniquely well suited to Alberta agriculture for another reason, one that calls to mind the mantra of real estate agents everywhere: location, location, location. Just as location is one of the most important factors in determining the value of a house, location also dictates the power-generating capabilities of any given solar PV system. And it just so happens that Alberta is a prime location for catching some rays.

"The southeast corner of Alberta has the best solar resource in Canada," Vonesch said. "To put it in perspective, on an annual basis, systems here in Alberta perform 50 to 60 per cent better than those same systems installed in Germany, which has more solar than anyone in the world.

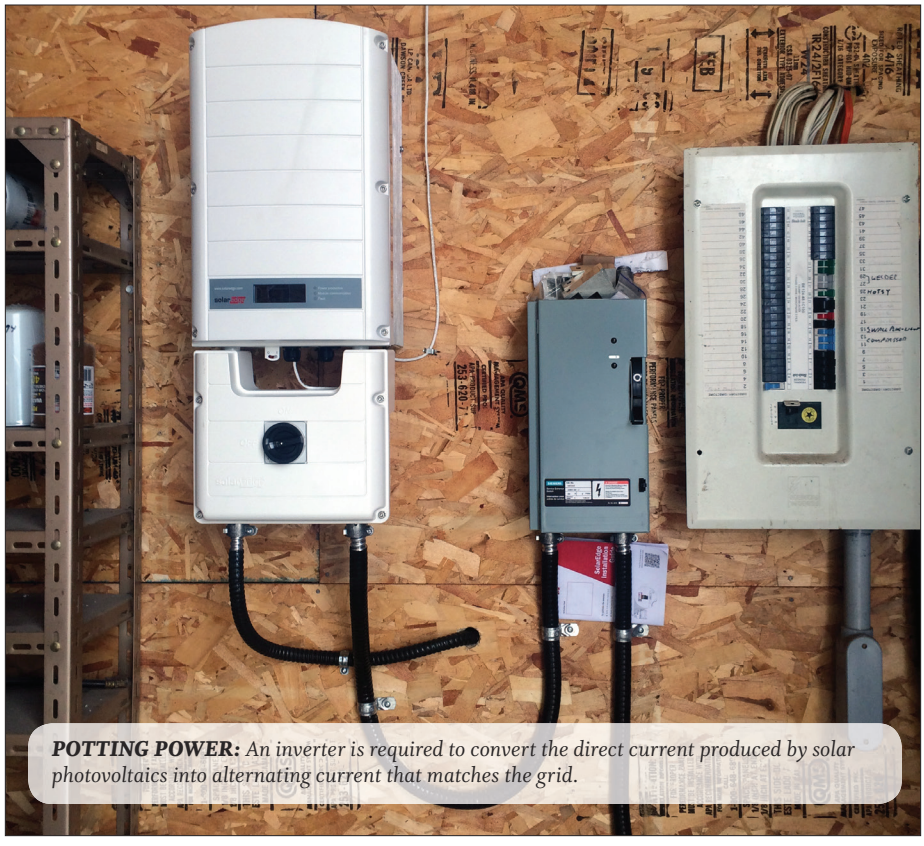
"We get a lot of sun year round, and on an annual basis we get really good production out of these systems."

The obvious benefit of installing an on-farm solar PV system from a business perspective is to save money on energy costs down the road, and many farmers elect to have a system installed in an effort to hedge against any future increases in the cost of electricity. Some look forward to reaping the cost benefits of "free" energy, once their total energy savings equal the cost of their system. However, others like Ziegler look beyond the dollar figures, to benefits that are a bit harder to quantify with ones and zeros.

As concerns about the environment, greenhouse gas emissions and climate change have intensified, agriculture has been put under the microscope. As a result, a number of efforts have been launched to cultivate social licence and show consumers that Canadian agriculture is sustainable and should be viewed primarily as part of the climate change solution, rather than the problem.

From this perspective, Ziegler found that installing a solar PV system on his

SPOTTING SUNBEAMS: *Kenton Ziegler's 13.26kW solar photovoltaic system consists of 51 roof-mounted panels.*



POTTING POWER: *An inverter is required to convert the direct current produced by solar photovoltaics into alternating current that matches the grid.*

farm went a long way to show urban Albertans that farmers are committed to sustainability and environmental stewardship. In theory, his system should produce as much electricity as his farm consumes, making his operation "net zero" when it comes to energy use.

"When I tell my city friends that I've put solar panels on, they think it's really cool," he said. "Right away, there was a little more credibility."

Despite the advantages that solar has to offer from a financial and environmental perspective, the technology does come with a couple important caveats. Chief among these is the long period of time required for most solar PV systems to pay for themselves.

"Even as the price of solar PV equipment has dropped over the last two to five years, the price of electricity in Alberta has also dropped significantly," said Kelly Lund, research engineer for on-farm energy systems at Alberta Agriculture and Forestry. "So the payback hasn't changed all that much.

"We're just saying, as a rough guide, it's probably still an 18- to 20-year payback, depending on how big of a system size it is. Some may be able to do a bit better."

Based on the long payback period for most solar PV systems, Ziegler emphasized the importance of approaching the process with the right long-term mindset. "It's not a money-maker," he said. "Don't ever think of this as a revenue stream. Think of it as offsetting your current consumption."

> ***"When I tell my city friends that I've put solar panels on, they think it's really cool."***
> ***–Kenton Ziegler***

SOLAR INCENTIVES

One factor that has helped convince some on-the-fence farmers to invest in solar technology is the availability of grant funding from the Government of Alberta through Growing Forward 2. Applications are fielded and grants are distributed through the On-Farm Solar Photovoltaics program.

"The Growing Forward 2 assistance for them has piqued a lot of interest and helped to improve the economics," Vonesch said.

For Ziegler, who had longstanding plans to experiment with solar on his farm, the availability of grant funding was a nice bonus that allowed him to start the process ahead of schedule. "It wasn't the driver for the decision, but the funding allowed me to do this three years earlier than I thought I could," Ziegler said.

The On-Farm Solar Photovoltaics program has now been running for the better part of a year, and Lund said applications for funding have continued to trickle in at a reliable rate as farmer interest in solar slowly spreads across the province. "It's kind of a slow and steady interest," she said. "Certainly, every month we're getting new applications. The interest is still out there."

For qualifying farmers, the program funds solar PV systems at a rate of $0.45/watt for third-party contractor-installed systems, to a maximum of 20 per cent of the project costs. The program is "fairly modest by design," according to Lund. But when systems roughly the same size as Ziegler's can cost $30,000 to $40,000, saving 20 per cent can be significant. Self-installed systems are funded at a much lower rate, and both self- and contractor-installed systems qualify for funding at a higher rate if an energy assessment has been conducted.

To be eligible for the program, a farmer's solar plans must meet several criteria. Important among these are requirements that solar PV systems must be connected to the grid and comply with Alberta's micro-generation legislation.

"Any project that is submitted for approval has to qualify as a micro-generator. So they can only produce as much electricity on an annual basis as they would use, more or less," Lund said. "It's not an avenue for commercial generation."

Currently, the program can fund up to a maximum of $50,000 or 100kW of solar generation capacity for each applicant. According to Vonesch, this has led the owners of many large-scale farming operations, which include a number of Hutterite colonies in the province, to wait for a better deal that could emerge down the road.

"They see this grant as maybe not enough for them to make a big leap into solar because they want to do a much larger system that has a more meaningful effect on their total energy use," he said.

However, according to Lund, "if people can qualify for systems that are larger than that where we would max out, we'll still fund to the limit. If they wanted to do a 250kW system, and that system still qualified as a micro-generator, we'd still fund to the limit of our program. It's not that they would have to size it smaller to qualify."

TAKING THE PLUNGE

For farmers who are interested in purchasing a solar PV system for their operation, once they get in touch with one of the province's solar providers the process is relatively straightforward, according to Vonesch.

"We usually start with some high-level, ballpark numbers and the economics based on their [energy] consumption or what their size will allow for a system," he said. "If that has piqued their interest still, then we'll come out for an assessment where we'll look at the structure we're mounting to—or if it's a ground-mount, that site and the shading on site—and then the electrical integration, and work through all those details to be able to get back to them with a firm quote and proposal."

Farmers can choose between having their new solar PV system mounted on the roof of an existing structure on their farm or on the ground. According to Vonesch, the right mounting location varies depending on the customer, but a roof-mounted system will be cheaper because you don't need to build foundations like you would for a ground-mounted setup.

"Even if you might not be at the perfect angle on the roof—often you're lower pitched than we do for a ground mount—those losses from being at a non-optimum angle are more than made up for by the much lower system cost," he said. "So you end up with a lower cost per hour of kilowatt energy produced overall by using an existing structure."

There are a number of solar providers available to farmers in Alberta, but the costs can vary quite dramatically from company to company.

"When I was getting quotes, it paid to shop around," Ziegler said. "Things change pretty fast in that industry and pricing does change."

Lund agreed, and said it's especially important to get the best deal available when you're paying for both the equipment and its installation. "Any time you're hiring a contractor and entering into a purchase-and-install contract, we definitely recommend getting usually at least three prices [quoted]," she said.

Once you've shopped around for the right solar provider, hashed out the details of your solar PV system and had it installed, the hard part is over.

"It's quite a reliable technology and it's virtually maintenance-free," Lund said. "Once it's installed, it's pretty much guaranteed to operate for the life of the system with very few problems."

Solar panels become less efficient at generating power as they age, but, thankfully, the drop-off in performance is less dramatic than you might think.

"The modules themselves have 25-year power output warranties," Vonesch said. "So they slowly degrade over time, but they're guaranteed to produce 80 per cent of their rated output at year 25.

"The inverter, the only other major component in the system, typically has a 10- or 12-year product warranty. That's the weakest component in the system." He added that most customers should expect to spend some money on maintenance or replacement for their inverter—which converts the direct current produced by solar panels into alternating current for the grid—after 15 to 20 years, but that SkyFire Energy factors in this cost when assessing the overall economics of the system.

GROWING THE MARKET: *According to SkyFire Energy partner and COO David Vonesch, 40 to 50 per cent of his company's customers in the past year have been farmers, and the farmer share of the solar market is expected to grow.*

The panels themselves are extremely durable, and can even withstand the vicious hailstorms that have long caused serious headaches for farmers across the province.

"Typically, if somebody is installing a system, we're mounting them south-facing or at least at an angle of some kind," Vonesch said. "In that case, we've never had a panel break from hail in the 15 years we've existed in Alberta, and many of our systems have seen some pretty major storms."

A BRIGHTER FUTURE

Lund expects funding levels for the On-Farm Solar Photovoltaics program to remain constant for the immediate future, so there will be plenty of opportunities for interested farmers to apply for grants going forward.

Meanwhile, Ziegler said he hopes that at some point down the road, Alberta's micro-generation rules might change to allow him to expand his current system. "I definitely would love to expand it, but currently the micro-generation laws in Alberta don't allow me to produce more than I consume," he said. "At this point in time, there are a whole bunch of reasons why that can't happen, but it may be an option in the future."

His ultimate goal is to take his system off-grid, which would allow him to store electricity generated by his solar PV system in batteries. However, he said, "currently, that's cost prohibitive."

For now, as more and more farmers start to consider the benefits of investing in this renewable energy source to fuel their operations, it seems the future of on-farm solar in Alberta is bright.

"I'd say we're now past the early-adopters stage in that market and getting more into the mainstream market, where the average farmer is looking at it more and more seriously," Vonesch said. "The price of these systems is continuously dropping as well, which obviously helps too. I think that market will continue to grow."

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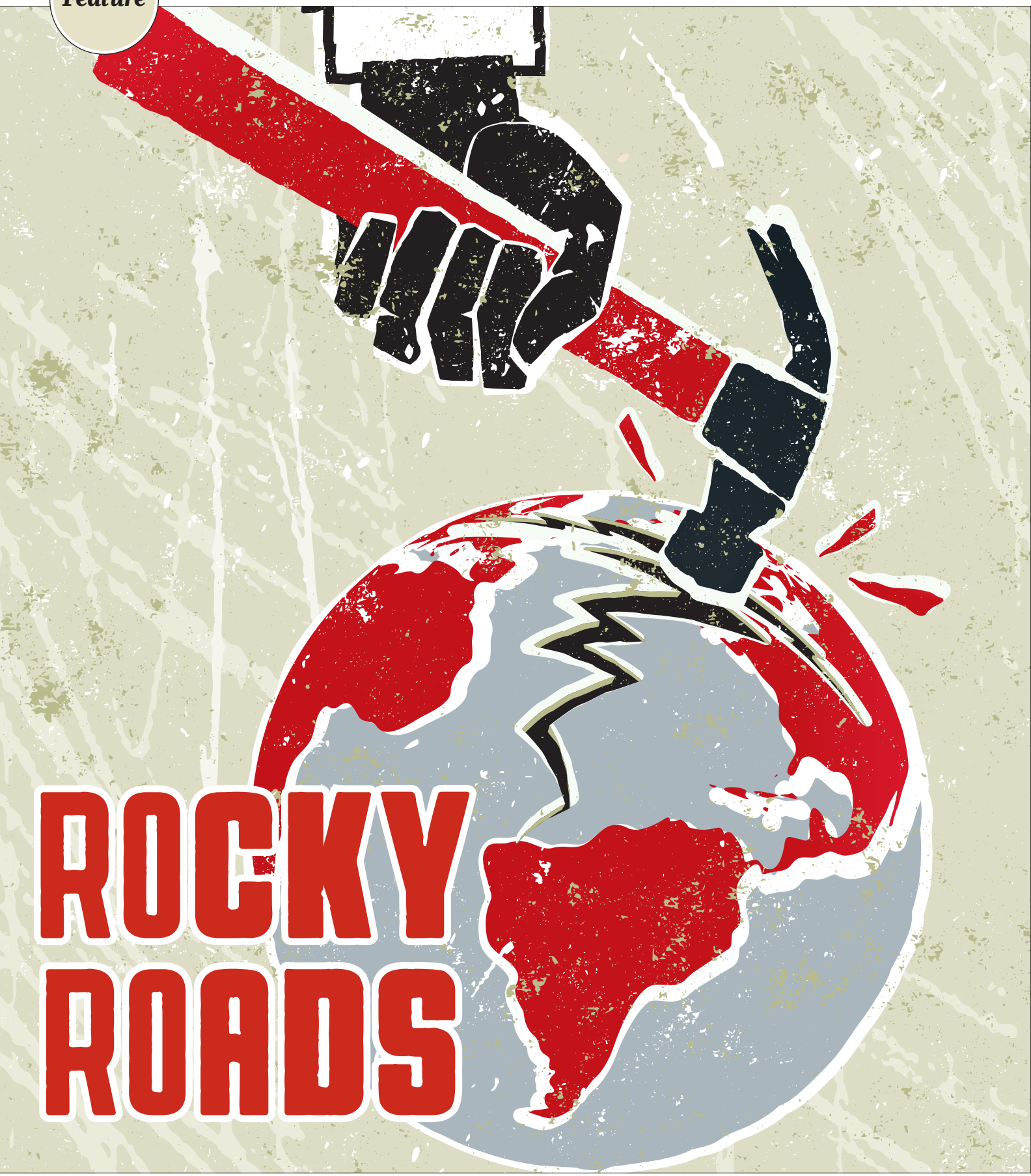


ROCKY ROADS

Is the anti-trade trend a speed bump or a dead end for Canadian agriculture?

BY GEOFF GEDDES • ILLUSTRATIONS BY iSTOCK PHOTO

FOR HOCKEY PLAYERS, A NO-TRADE CLAUSE means job security. But for Canadian agriculture, the tide of anti-trade sentiment that is rising around the world is making insecurity the new normal.

As protectionist rhetoric and policies have ramped up in a number of countries in recent months, many feel the trend has driven global trade numbers down and endangered critical trade deals. This has left some industry stakeholders worrying about how Canadian agriculture, as a trade-dependent economic sector in a trade-dependent country, will be affected.

"There is strong consensus among economists that international trade has contributed to prosperity and job creation around the world," said Claire Citeau, executive director of the Canadian Agri-Food Trade Alliance. "Throughout history, trade has proven to be one of the most powerful tools available for economic growth, and that still holds true today."

As Citeau pointed out, Canadian agricultural and agri-food exports produce a GDP of $30 billion for agriculture and $65.5 billion for food manufacturing. In the process, these exports generate almost a million Canadian jobs.

In light of the stakes, it's little wonder that recent world events have many on edge.

PLAYING THE TRUMP CARD

"Phenomena like Brexit and the election of Donald Trump show the world moving away from liberalized trade," said Brian Innes, vice-president of government relations for the Canola Council of Canada. "Our politics are influenced by a lot of voices opposing trade. Right now, those voices are stronger and have more impact than in the past, and that's fuelling the protectionist push."

While Brexit and Trump may be products of that opposition, they raise an important question: Where did the opposition come from?

Through his work as president of the Canadian Federation of Agriculture, Ron Bonnett feels he might have gleaned the answer.

"We were in Geneva during the U.S. election for a meeting with trade ambassadors and one of them expressed what many of us were feeling," said Bonnett.

That ambassador saw the election result as Trump tapping into anger among the unemployed and underemployed as they sought to assign blame for their situation. According to Bonnett, those voters ignored the simple truth: you can't stop progress.

"Modern economies are restructuring on a scale that we haven't seen since the Industrial Revolution," he said. "This is a whole new era of technology where we do things differently than we ever did before, and right now we're in a transition period as people try to adapt."

It's a period where lucrative manual labour jobs are disappearing and a lot of retraining is needed to keep up with the changes.

"Many workers are having a hard time adapting," said Bonnett. "It's easier to blame trade and globalization than to acknowledge that things are more complex."

TRADE WINDS COOLING OFF

This hostility toward global trade has left some critical trade deals hanging by a thread. For its part, Canadian agriculture hopes our country isn't hung out to dry when the smoke clears.

"The outlook for world commerce in 2017 is uncertain," said Citeau. "There are more questions than answers at this point."

Many of those questions centred on the Trans-Pacific Partnership (TPP), signed in 2016 by Canada and 11 other countries. It would have created a free-trade area extending from Chile to Japan, but Trump pulled the United States from the deal.

"What is Canada's plan now that the deal as currently written is not moving forward under the Trump administration?" said Citeau. "How will Canada achieve the economic objectives of the TPP, create a level playing field and gain competitive access to fast-growing markets in the region such as Japan, Vietnam and Malaysia, among others?"

Similar concerns were expressed by Innes, who sees the demise of the TPP in terms of lost potential. "This deal was incredibly positive for Canadian agriculture in general, and canola and grain farmers in particular," said Innes.

Because it involved so many countries, Innes viewed the TPP as a rare opportunity to have agreements with multiple partners on issues that a bilateral deal couldn't address, such as labour, the environment, and the health of plants, animals and humans.

Questions also exist concerning the Canada-European Union Comprehensive Economic and Trade Agreement (CETA), a free-trade agreement that, if enacted, will eliminate 98 per cent of the tariffs between Canada and the EU.

"The CETA offers tremendous potential for Canadian agriculture and agri-food exporters," said Citeau. "However, with outstanding issues related to the timely approval of biotech traits and meat-processing systems, the commercially viable access that was promised for all exporters may not be fully achieved by the time the agreement is implemented."

Bonnett said that he's still confident the deal will move ahead, but "it will take some time and may hinge on the upcoming election in Germany." However, just as Trump's election has put the TPP at risk, the Brexit vote has sparked uncertainty about CETA.

"The same anti-trade rhetoric is happening in Europe," said Bonnett. "It's interesting to see the British government struggling in the wake of Brexit. Everyone partied after the vote; now it's like they've woken up with a hangover and are grappling with some tough questions: 'What did we do? Now what? How do we get out of it?'"

In today's trade climate, even long-standing deals like the North American Free Trade Agreement (NAFTA), enacted in 1994, aren't secure, as Trump has vowed to renegotiate the terms of the agreement.

Given that NAFTA created one of the world's largest free trade zones, spanning Canada, the United States and Mexico, Trump's promise to renegotiate the terms of the deal has raised eyebrows and heart rates.

"We are working to help lawmakers understand how trade benefits both Canada and the U.S.," said Innes.

For example, Innes pointed to the tariff-free access for Canadian canola oil and meal south of the border under NAFTA. "The U.S. is our No. 1 canola market," said Innes. "Because our canola meal helps cows produce up to one kilogram more of milk per day, it's a huge boost to American dairy farmers and the U.S. economy as a whole."

As important as these deals are for Canadian agriculture, there is another issue that warrants attention from industry.

"I see the more significant threat being non-tariff trade barriers," said Cam Dahl, president of Cereals Canada. "It's not just about tariffs. Sanitary and phytosanitary issues, such as non-science-based barriers to pesticides, pose an even greater danger to agriculture. We have to work together across commodities and as a Canadian team to tackle these issues."

Though few would blame Innes and others for wringing their hands over the current trade issues, he and his colleagues recognize that the window for dwelling on problems has passed—it's time for solutions.

"The best safeguards against protectionism are a strong, multilateral trading system and regional trade agreements," said Citeau. "The Canadian government must push hard for a solid global trading regime and continue to deliver new trade deals."

According to Dahl, "the first priority for agriculture is a free trade agreement with Japan. We also need to work on bilateral deals with other countries to address competitive imbalances that would have been solved by the TPP."

While he agreed with Dahl about the importance of Japan, Innes suggested Canadian agriculture's trade priorities should stretch much further. "Canada has to be a leader in the Asia-Pacific region to ensure competitive access for our agriculture products," he said. "Farmers in Manitoba should have the same opportunities as those in North Dakota or South Australia. To achieve that, our government must be ambitious in its Asia-Pacific trade agenda."

WILL FACTS TRUMP FEAR?

"The first casualty of war is truth." Fast-forward 100 years and those words, first uttered by a Republican senator in 1917, could easily be applied to the current war on global trade.

"Many people who benefit from trade don't even realize it," said John Masswohl, director of government and international relations for the Canadian Cattlemen's Association.

Even among farmers, Masswohl finds that many from south of the border grow wheat, corn or soybeans and sell them to a local dealer or mill, yet don't necessarily see their grain become flour that is value-added and then exported.

"Adding to the challenge is [the fact] that those who oppose trade are good at organizing protests and getting attention," said Masswohl. "The public

doesn't latch onto the facts and details—they just see that people are upset about globalization and figure there must be something wrong with it."

Consequently, "it's crucial that we communicate the benefits of trade to all concerned," said Innes, who also serves as president of the Canadian Agri-Food Trade Alliance (CAFTA). "The country has to understand the importance of agricultural trade for our economy, and it starts with organizations like CAFTA getting the message out."

Although that's a tall order, it appears Canada might be on the right track.

"Minister [Chrystia] Freeland [Canada's former trade minister and current minister of foreign affairs] has been an ardent promoter of world trade when many others have not," said Innes. "She understands that progressive trade means we can have trade agreements that protect areas of importance to us, like labour standards, the environment and the rule of law, yet still deliver results for our internationally competitive exports like agriculture."

As industry and government work overtime to combat anti-trade sentiments, many feel the stakes couldn't be higher.

"International trade is crucial for Canadian agriculture and agri-food," said Citeau. "Eighty per cent of commercially oriented farms and 90 per cent of all Canadian farms rely on exports, as do half the jobs in crop production and a quarter of the jobs in food manufacturing."

On the bright side, in spite of the fear sparked by growing protectionism, the situation might also be less dire than some portray it to be.

"Experts agree that weakness in economic growth in recent years, not isolationist trade policies, has been the primary restraint on trade growth, accounting for up to three-quarters of the slowdown," said Citeau. Specifically, she pointed to the economic downturn in China, a severe recession in Brazil, falling prices for oil and other commodities, and exchange rate volatility as the main causes of trade weakness in 2015.

Looking ahead, "the World Trade Organization recently predicted a modest upturn for 2017, forecasting worldwide trade to rise between 1.8 and 3.1 per cent in the coming year," said Citeau. "While this is a downward revision from its earlier forecast of 3.6 per cent, it's still better than the sluggish 1.6 per cent growth of 2016."

BEARING DOWN AND STEPPING UP

Even those who worry about the short-term future of trade see reasons for hope.

"I don't think Trump is against trade agreements. He just opposes deals that he didn't negotiate," said Masswohl. "I still think he intends to enter trade deals, but it will be 'America first' so that they get a better deal than anyone else."

Still, Masswohl believes there are opportunities to be had dealing with the Trump administration. "Republicans tend to focus on competiveness and reducing regulatory burdens," he said. "I think there is a chance for co-operation between our two countries on this."

The experts disagree whether the current trade trend is a bump in the road or the new normal for international relations. On that subject, Bonnett favours the former.

"We're concerned, but we're not hitting the panic button," said Bonnett. "We have to do our homework and build the necessary alliances to move ahead. There may be some adjustments to trade agreements going forward. However, I don't think you will see strong opposition continue."

Citing a recent survey on consumer impressions of trade, Bonnett said the overall picture is fairly positive, despite the visibility of anti-trade voices. "The majority of respondents understood that trade creates jobs and offers choice for consumers," he said. "The survey results suggest a discrepancy between the rhetoric and the core beliefs of the buying public."

As the drama unfolds in the months to come, Bonnett has booked a front-row seat. "It will be fascinating how this evolves and if the Trump election rhetoric ratchets down in favour of a more pragmatic approach," he said. "We'll have to wait and see."

In spite of her concerns, Citeau is also hopeful. "As pointed out by Dominic Barton, chair of Prime Minister Justin Trudeau's Advisory Council on Economic Growth, Canadian agriculture and agri-food processing hold much potential in contributing to Canada's next big economic pitch," said Citeau. "At a time when governments are looking for ways to spur economic growth, we need more trade, not less."

Feature

STAYING THE COURSE

Crop researchers hope to continue and expand valuable work under new ag policy framework

BY ALEXIS KIENLEN • PHOTOS COURTESY OF TYLER DIFLEY AND GEORGE CLAYTON

WHEAT AND BARLEY research has improved by leaps and bounds under the *Growing Forward 2* agriculture policy framework—specifically, thanks to the AgriInnovation program and its associated research "clusters." The program is focused on research and development activities that bring innovation to the sector and bring new varieties of wheat and barley to commercialization. The five-year program will end on March 31, 2018, and a new program is expected to kick in as part of *Growing Forward 2*'s successor on April 1, 2018, but details have yet to be announced.

According to Garson Law, former research manager for Alberta Barley and program manager of the *Growing Forward 2* AgriInnovation cluster for barley, each cluster is a grouping of related scientific projects. The clusters fit into groups of themes, and multiple projects can fit into one cluster.

"They're meant to develop regional and national teams. They're meant to generate or build collaboration among scientists, like in a region such as the Prairies, or nationally. That's been largely successful in speaking with scientists who are part of a cluster," said Law. "The connections that they've built across the

country have been very helpful, so they're looking forward to doing more of the same in the next cluster."

The current barley cluster includes projects from Alberta to Prince Edward Island, and Law expects that the next cluster will expand to include additional research scientists in Quebec, Ontario, Manitoba, Saskatchewan and Alberta. The barley cluster under the new policy framework will likely expand the program and create even stronger networks of cereal researchers that will be more efficient and effective, with a greater degree of collaboration.

The AgriInnovation program is extremely important, and represents a huge financial investment from the federal government, the provincial government and producer groups across the Prairies. The total program funding for the barley cluster is $12 million, $8 million of which came from the federal government, with the remainder coming from producer groups and the province. The total program funding for the wheat cluster is $25.2 million, with $12.7 million coming from the Alberta Wheat Commission (AWC), the Western Grains Research Foundation (WGRF) and the Canadian Field Crop Research Alliance, and the remaining $12.5 million coming from the federal government. Additionally, in 2015, AWC partnered with several producer and industry groups to fund 11 winter wheat research and development projects, with matching funds provided through the AgriInnovation program. In this case, the total investment from all partners of $2.2 million is spread out over four years.

AgriInnovation under *Growing Forward 2* has been beneficial to wheat and barley breeding programs because it's brought both producer and private funding into the mix.

"It's primarily producer and public funding, but in specific cases, there is some private interest also. It's a Canada-wide program approach for funding wheat and barley development. And it really provides core program funding," said Garth Patterson, the Saskatoon-based executive director of WGRF.

The AgriInnovation program has made a major difference in the lives of cereal breeders, said Harpinder Singh Randhawa, spring wheat breeder at Agriculture and Agri-Food Canada's (AAFC) Lethbridge Research and Development Centre. "We work as collaborators, and this fosters more collaboration between universities and AAFC and other institutes," he said. "This helps us to pool our resources and enhance our capacity."

The cluster program enables both AAFC and other industry groups to leverage funds from each other. Overall, the program has helped industry leverage up to three times the federal funding from private sources by acting as a catalyst for applied research. The program is driven by the industry, and allows research to be prioritized according to sector and producer needs. More than 415 applications have gone through the AgriInnovation program since its inception. The results have been overwhelmingly positive.

INNOVATIVE IDEAS: *The AgriInnovation program has helped cereal researchers across Canada to make great strides in wheat and barley variety development, agronomy and plant pathology research.*

The wheat cluster includes 50 research projects and has developed new varieties that have higher yield, quality and disease resistance in all classes. The barley cluster, which includes 27 barley-related projects, has focused on developing more resilient varieties with greater sprout tolerance and shatter resistance in order to withstand excessive moisture or drought conditions. Scientists in the program are also working on other projects, ranging from breeding genetics to agronomy, pathology, food and nutrition.

Stable, long-term funding is crucial for cereal researchers. Researchers like knowing what their sources of funding are, how much they can leverage and how much money they can expect to have.

"Wheat breeding is a long-term process, and you can't operate with a couple years of money here and there," said Randhawa. "These are locked, contractual agreements with industry people and AAFC for the five years, which is great.

BREEDING COLLABORATION: *Cereal breeders like Agriculture and Agri-Food Canada's Harpinder Singh Randhawa have seen the benefits of the AgriInnovation program's collaborative approach to research funding.*

You have certainty that you have budget allocated for the next five years."

Breeding programs are a continuum, said Pat Juskiw, a barley breeder with Alberta Agriculture and Forestry at the Lacombe Field Crop Development Centre (FCDC). She uses AgriInnovation funding for her malting barley breeding program at the Centre.

"What it has allowed us to do—which we were stumbling with or not doing before—is to use markers in our breeding program," she said. "It has enhanced our ability to identify markers that were useful in our breeding program, and to implement them on an annual basis. That has been a real strength and benefit to our breeding program."

Many research programs, including those focusing on malting barley breeding, are long-term games that require long-term funding.

"From the time you make a cross until the time it gets into your beer bottle, it will be 15 years," said Juskiw, although Juskiw and other breeders are working hard to get that number down to 10 to 12 years.

Jennifer Zantinge, an Alberta Agriculture and Forestry research scientist and molecular geneticist specializing in wheat, barley and triticale at the Lacombe FCDC, said the cluster approach has fostered collaboration between different groups of researchers that might not otherwise interact. "When I look at it as both industry and research, academic research is more academic, and ours is more applied," she said.

In research, there is often a missing link. Academic researchers might do a lot of gene sequencing, but then it takes investment for applied researchers to use those markers in their breeding programs. The clusters help focus the research, identify what work is needed and encourage various groups to work together. Academics can focus more on general knowledge, and then applied researchers take that research and tailor it to things producers need on their farms.

Now all groups within the research community have a better understanding of what the other players are working on, and there's improved communication between the sectors.

The AgriInnovation program is currently working well under *Growing Forward 2*, but things weren't always as straightforward.

"It took a long time to put all these collaborators' agreements in place, so pretty much one year we ran without funds because we were still dealing with all these agreements," said Randhawa. "But I am sensing the problem is solved now."

He doesn't think that problem will

occur under the new policy framework either, since there have already been meetings and consultations about the transition. "They're starting a couple years earlier," he said.

When the clusters originally began, there were some administrative problems, and different researchers and levels of government struggled to maintain connections and report back on projects. However, the bugs in the program have been fixed, and some of the processes could be further streamlined in the next cluster, reducing administrative hurdles.

The new framework is expected to encompass most of the core activities currently taking place, while providing for new innovations. There will also be new priorities and a new direction set forth by the federal government.

"These will be part of the conversation between those priorities and the needs of producer groups like ourselves, and commercial entities that will have an opportunity to put together a cluster that will be a benefit to everyone," said Law.

The exact specifics of the new policy framework and AgriInnovation cluster programs have not been revealed, but an announcement is expected in either May or June 2017.

"Not having seen what the program will consist of, or what the program pillars will be, we're working on what we believe will be the major pillars that make up the bulk of the next framework," said Law.

There have been a number of positive signs at AAFC, including the hiring of replacement personnel for scientists who have retired recently or who are planning to retire, in order to ensure the transition to the next framework is as smooth as possible.

The research sector put out a call for letters of intent in January. The Barley Council of Canada, for example, has already gathered research proposals from potential funders for the next cluster. Many of these funders were not included in the previous cluster, or were not in existence when the cluster formed. Research priorities have already been discussed, and funders have met to discuss potential projects, as well as a national research strategy for barley. Wheat cluster preparations are also underway, involving all participants in the current wheat cluster, as well as the Saskatchewan Wheat Development Commission and the Manitoba Wheat and Barley Growers Association.

"There are a lot of changes on the management or administrative side based on how difficult it was for the managers to manage the clusters this time around," said Law.

Juskiw has other concerns about the transition to the new framework and how it could impact ongoing and planned crop research. "I guess when you transition to a new framework, you always worry about what the level of funding and reporting will be, and what the reporting requirements will be. That's pretty much administration," said Juskiw. "There are always concerns, and we know we need to be accountable."

When a new funding framework is on the horizon, researchers often worry about whether the level of research funding will be enough to do everything that needs to get done. However, if the new framework takes into account the continuous nature of breeding programs, the transition should not be an issue, according to Juskiw.

The current Liberal government has different priorities than the previous Conservative government, which was responsible for *Growing Forward 2*, and many stakeholders are expecting those differing priorities to be reflected in the new program.

During consultations about the new policy framework, industry stakeholders recommended that the AgriInnovation program have increased flexibility for funding recipients when it comes to allocating money, and increased transparency and timely decisions in the project approvals process, said Patrick Girard, a spokesperson for AAFC, via email.

> ***"What it has allowed us to do—which we were stumbling with or not doing before—is to use markers in our breeding program."***
>
> ***–Pat Juskiw***

The government has conducted consultations for the next policy framework, and has identified that knowledge dissemination and technology transfer should be a priority, along with communicating the results to the industry. In the next policy framework, federal, provincial and territorial governments will continue to focus on science, research and innovation to support the sector, said Girard. The first phase of consultations began in January 2016 and more than 300 industry groups were involved, while the second phase of consultations ran between July and November 2016, when members of the Canadian public were invited to share their views.

The five-year approach allows research to continue without any funding gaps. When there are gaps in funding, it can be detrimental to individual projects, or to entire areas of research.

As it stands, Patterson said he is satisfied with the AgriInnovation program in its current iteration and hopes to see it continue into the next policy framework. So far, all signs from AAFC seem to indicate that the AgriInnovation program will remain a fixture of Canadian crop research under the new framework.

"Federal, provincial and territorial governments are working hard to develop the next policy framework and have committed to continuous programming," said Girard.

Feature

THE FUTURE IS NOW

The old guard passes the torch to Canada's new generation of ag researchers

BY TAMARA LEIGH • PHOTOS COURTESY OF NEIL HARKER, GARSON LAW AND BOYD MORI

IN AGRICULTURE, SUCCESSION planning isn't just an issue that affects the farm. As senior researchers in government and post-secondary institutions near retirement, the pressure to recruit the best and brightest students into agricultural research is getting higher.

"In tough times, succession planning is usually one of the first things hit because it takes time and training," said Clair Langlois, cereal extension specialist with Alberta Agriculture and Forestry. "In the long term, it's not necessarily a wise way of going."

Langlois has had a long career in applied agriculture research. Now his job is to bridge the gap between producers with questions and the researchers who can provide answers.

"Young researchers come to the industry with fresh ideas, fresh perspectives and new energy," he said. "We need to have a constant influx of them so we can have our research icons mentor them before they retire."

Facing complex issues including climate change, herbicide-resistant weeds and productivity challenges, agricultural research is essential when it comes to helping farmers innovate, adapt and remain viable into the future. In some ways, it is the complexity of these challenges, and a desire to make a difference in people's lives, that make agriculture attractive to the next generation of researchers.

Breanne Tidemann, Laurel Perrott and Boyd Mori are three fresh faces in the field of agriculture research. Their work and their journeys are different, but they share a common goal: to find practical solutions to agriculture's most pressing problems in order to move Canada's agriculture sector forward.

BREANNE TIDEMANN

Research scientist, Agriculture and Agri-Food Canada

Breanne Tidemann likes to know her work is making a difference. She grew up on a grain farm in Saskatchewan, but decided to study biological sciences on her way to becoming an orthodontist. Two years into her studies, she found out she didn't like teeth, triggering an early-life crisis.

Her interest in agricultural research was sparked when she went home that summer and got a job at Agriculture and Agri-Food Canada's (AAFC) Scott Research Farm, 10 minutes down the road from her family's farm.

"I fell absolutely in love with agriculture research. For me, it was an applied way to use my science background," said Tidemann, adding that she sometimes struggled to see the point of some of the pure science work she did in school.

"Agriculture research was still science—it was still asking the questions and trying to figure things out—but with a direct application where I could see that if we work on this new herbicide, or this new fertilizer rate, this could help my dad on his farm," she said.

Tidemann completed her undergraduate degree and spent some time working in different areas of agriculture before deciding to pursue a master's at the University of Alberta in weed science. It proved to be a good fit, and veteran research scientist Neil Harker recruited her to AAFC's Lacombe Research and Development Centre, where she was offered an opportunity to work full time while she completed her PhD.

"My primary area of interest has been weed science and looking at new ways of managing, in particular, herbicide-resistant weeds. In places like Australia and the U.S., they've had a more significant problem with herbicide-resistant weeds than what we have, but we expect our problems to continue increasing as long as we rely solely on herbicides for weed control," said Tidemann. "In my master's, I was looking at new herbicide molecules we could use, and then I got into more non-chemical control measures in my PhD."

As she wraps up her PhD, Tidemann is excited about what the future holds. She has been hired as a research scientist to replace John O'Donovan, who retired last year from AAFC's Lacombe agronomy program, and she will continue the weed program in Lacombe after Harker retires. She said she is grateful for the opportunity she has had to work on and learn the programs while she completed her PhD, as well as the continuity of the technical staff who support the programs.

Despite the challenges of establishing networks, and trying to secure project funding when you're starting a career, Tidemann said she has been greeted warmly by the industry. "People have been very willing to provide information, advice and guidance," she said. "It can be a bit tough to break into the typical collaborations—you have to be a bit more outgoing than I necessarily expected. You have to be the one to reach out and say 'I'm here and I'm looking for projects.'"

LAUREL PERROTT

Crop researcher, Lakeland College

Growing up in a rural setting doesn't necessarily mean you will know a lot about agriculture. That was the case for Laurel Perrott, until she connected with a group of agriculture students while she was working on her undergraduate degree in science at the University of Alberta.

"I knew farming existed and thought it was great, but it never occurred to me that I could do that as a profession," Perrott said. "I didn't understand that there was a whole industry behind it."

The budding researcher transferred into the crop sciences program at the university, then worked for Cargill in Vermilion for a year-and-a-half after graduation before she decided to go back for a master's degree in barley agronomy.

Since her discovery of agriculture, Perrott has made the most of her time in the field. While she was still working on her master's research, she accepted a full-time job to start up the crop research program at Lakeland College.

"When I came to Lakeland College, they had just started thinking about doing small-plot research and they had

bought a combine, but that was about it," said Perrott. "We got a first season under our belt last summer. We did a few of our own trials and collaborated with Linda Hall from the U of A on some plant growth regulator work. It launched us off, got us some experience collaborating and got our name out there."

The program has taken off since Perrott joined the applied research team to expand the crop research program. She has been able to use her relationships and expertise to set up more collaborative projects for the 2017 growing season with Hall at the University of Alberta and Sheri Strydhorst at Alberta Agriculture and Forestry, looking at forage agronomy and cultivar-specific wheat agronomy.

Perrott will defend her master's thesis this spring, and said she will likely take a break before considering a PhD.

"What excites me about the future with agriculture research is that I know the career is always going to be challenging and changing," she said. "It's always striving to discover new and valuable things for farmers that drives me.

"I've been living on a mixed farm with my fiancé for the past few years, so I have a foot on the farm and a foot in research. It helps me identify where we should be researching and what challenges farmers are running into."

As someone who wasn't raised farming, Perrott said it took time and a concerted effort to learn about the business and the culture of the industry. She sought out learning opportunities and asked her friends if she could help on their farms. Throughout this learning process, she has developed an appreciation for how much there is to know and the importance of communication.

"To farmers, researchers are getting better at working with them and understanding on-farm logistics and what drives the management decisions that might counter what we find in research," she said. "I think it would be valuable to have a more open dialogue between farmers and researchers. Farmers are smart people—they have a lot of good ideas and recognize production challenges on their farm. If those ideas are shared more, they will turn into research. More cross-communication will benefit everyone."

BOYD MORI

Entomologist, Agriculture and Agri-Food Canada

Sometimes it's the little things that really captivate people. For Boyd Mori, he followed his interest in insects into a career in agricultural research.

Mori grew up in Abbotsford, a mid-sized city in the middle of British Columbia's berry belt. No one in his family farmed, but like many young people in the area, he picked berries when he was in high school, and even worked on a daffodil farm in the Fraser Valley.

"I had no idea I would end up working in agriculture," said Mori, who did his first degree in immunology at the University of Alberta. "I took a few courses in entomology and plant science that I really enjoyed, so I went back and did a second B.Sc. in animal sciences with a focus on entomology. The research kind of drew me in."

Entomology, the study of insects, offers a diverse array of opportunities for study, from horticulture and agriculture to medical and veterinary entomology. After completing an undergraduate honours project on the mountain pine beetle, Boyd decided to pursue a master's degree.

"My supervisor, Maya Evenden, had an opportunity for a M.Sc. student to start a funded project to work on red clover in the Peace Region. From that point forward it has all been agriculture," said Mori, who subsequently went on to complete his PhD as well.

Mori is currently an entomologist with AAFC at the Saskatoon Research and Development Centre. His work is primarily focused on the swede midge, a small fly that affects canola and other brassicas.

"Swede midge is devastating in Ontario, and turned up in Saskatchewan in

2008. They noted it was here and they noted some damage symptoms, but it's not a huge pest like it is in Ontario," Mori said. "So what's different in Saskatchewan compared to Ontario?"

Mori is looking at host-plant resistance to determine what plant hosts swede midge can attack, with a particular focus on weeds like wild mustard, stinkweed and peppergrass. He is screening the alternate hosts to determine whether they have swede midge-resistant properties and why.

"If we can figure that out, potentially we can dive deeper into the genetics of it and [find out] if it's a particular gene that is enhancing resistance. If it is, we could potentially give [that information] to breeders so that they could incorporate that into canola lines or other brassica vegetable lines," he said. "We are trying to use the plant to combat the insect rather than have to use a secondary approach."

Mori's work blurs the line between field entomology and lab entomology. While the fieldwork keeps him grounded, being able to bring new tools to bear on a problem—like genetic investigation—deepens understanding and opens up possibilities for new approaches.

"I think we're getting more integrative in agricultural research," he said. "You're not just an entomologist working on a problem. We're working with so many different people—plant breeders, geneticists, even engineers. It's looking at the whole agricultural system. You can't just focus on one single thing. You really have to look at the whole ag system and see how you can improve it."

DOES MORE NEED TO BE DONE?

The recent infusion of young talent into agriculture research is a good sign for the industry, as well as a relief to some of the researchers who are nearing the end of their careers.

Harker, one of Tidemann's mentors, has spent 32 years doing weed research and field research. As a research scientist in weed ecology and crop management at AAFC's Lacombe Research and Development Centre, he will be looking to researchers like Tidemann to carry on the valuable work he has done for the industry.

"For a few years, we were hard-pressed to find any graduate students in my area of weed science and general agronomy. There were very few that were taught in the western Canadian situation," said Harker, noting that interest is on the rise and there are now a number of qualified students working in the field.

Like any occupation, attracting and retaining talent to agriculture research means there have to be jobs available and funding to support the work. Harker said the federal government is starting to hire researchers again, after years of program cuts and fiscal restraint.

Industry also needs to display leadership on this front. Langlois' position with Alberta Agriculture and Forestry was created when producer groups identified it as a priority and pushed for action. They are also pushing for research investment and providing the much-needed matching funds to get projects off the ground.

As more and more young people grow up without a direct connection to agriculture, they need to be made aware of the science-based opportunities that agriculture has to offer in areas like computer, satellite and engineering technology, as well as plant and animal sciences.

"One of our challenges is making people aware that agriculture is a very vibrant and forward-looking industry in terms of new technology," said Harker.

It's a sentiment that Langlois echoed, while taking it one step further. "We don't do a very good job of promoting agriculture as a science-based industry like other sectors do," he said. "We're not going to promote more Canadian youth to get involved in science and agriculture without promoting agriculture first."

Selfish shellfish

MUSSEL INVASION POSES SERIOUS THREAT TO IRRIGATION IN SOUTHERN ALBERTA

SUPPLEMENTAL SNIFFERS: *Since 2015, Alberta Environment and Parks has supplemented its staff of human inspectors with several mussel-sniffing dogs to ensure all boats being brought into the province are mussel free.*

Photos: Alberta Environment and Parks

A TINY AQUATIC ANIMAL POSES A sizable threat to Alberta's lakes, rivers, irrigation infrastructure and municipal water handling systems.

Quagga and zebra mussels are two invasive species that attach themselves to hard objects in the water like irrigation pipelines. Although individual mussels are only two to four centimetres long, they reproduce rapidly and can cut off the flow of water through a pipeline within a matter of months, as one layer of mussels builds on the next.

In November of last year, water in Montana's Tiber Reservoir tested positive for quagga mussel larvae. The presence of these microscopic larvae (known as veligers) only 80 kilometres from the Alberta border put the province on high alert.

"Previously, the closest [detections] were in Utah, so now they're only a couple of hours away," said Ron McMullin, executive director of the Alberta Irrigation Projects Association (AIPA). "We're not putting our heads in the sand and saying we're never going to get them."

AIPA represents Alberta's 13 irrigation districts, which together have about 4,000 kilometres of pipelines irrigating almost 1.4 million acres of land that contributes $3.6 billion to Alberta's gross domestic product, according to a 2015 study done for the provincial government. The irrigation districts and the producers they represent have much at stake if the mussels make it to Alberta waters. It could cost millions of dollars to clear the mussels out of public irrigation pipelines and privately owned pivots.

In total, the province estimates a mussel invasion could cost up to $75 million per year, as irrigators, as well as power generating stations, property and boat owners, fishing enthusiasts, and municipal drinking water systems, could all be negatively affected.

In order to prevent the spread of mussels, the government passed legislation in the spring of 2015 mandating that all boats entering the province stop at inspection stations. Inspectors examine boats for the telltale roughness of mussels adhered to surfaces and make sure that boaters are aware of the province's "clean, drain and dry" policy for boats, meaning that boats and gear are cleaned; bilges, buckets and ballasts are drained before leaving the vicinity of a water body; and any standing water is dried.

In 2015, a few capable canines joined human inspectors in their efforts to find any stowaway mussels before they enter the province. Three dogs work full time sniffing boats, many of which provide hiding places for mussels.

"We were able to show that the dogs were very accurate and very efficient when inspecting the boats," said Cindy Sawchuk, invasive species conservation lead with Alberta Environment and Parks (AEP). "Mussels like to hide in dark, damp places, so the dogs help with that a lot."

Recognizing the risk that invasive mussels pose to its members, AIPA has contributed $215,000 to fund the training of more canine inspectors and their handlers, as well as "clean, drain, dry" signage at lakes and reservoirs.

In 2016, AEP inspected 19,000 boats, a massive increase from the 395 boats that were examined during the inspection program's first year in 2013. Seventeen mussel-fouled boats were intercepted—14 originated from Alberta's neighbouring provinces to the east and three came from the United States. The inspection stations were open from March to October of 2016 and will reopen again this month, as a number of boats belonging to Canadian "snowbirds" return to the country.

In addition to inspections, AEP also monitors Alberta's waterways for mussels and their larvae. In 2016, 70 water bodies were inspected for both adult mussels and larvae.

So far, all water bodies have tested negative, but mussels might not be kept at bay forever. An emergency response plan is in place in the event of an initial detection, and Alberta Agriculture and Forestry is currently researching the possibility of using potash dissolved in water to control mussels in the irrigation system.

The potassium in potash is toxic to mussels, but doesn't harm other fish and water insects. Some smaller water bodies in the U.S. have been treated successfully with potash, but the current focus is on using potash to control the mussels within the irrigation infrastructure.

Last year, scientists successfully injected water containing dissolved granular potash into a producer's pipeline.

MUSSEL MAYHEM: *If they made it into Alberta, invasive quagga and zebra mussels could build up in irrigation pipelines and other water infrastructure, causing millions of dollars in damage.*

"Once the potash-treated water has been placed in the pipelines, we're currently thinking it will be held in the pipeline for a few days and then that water will have to be irrigated out onto the crop," said Barry Olson, soil and water research scientist with Alberta Agriculture and Forestry's water quality branch.

Although not yet registered for control of mussels in Alberta, potash seems like a promising product to control mussels in irrigation systems. Along with being safe for other aquatic species, it is non-corrosive and already present in Alberta's clay soils, according to Olson. His department is also researching the effects of multiple potash applications on crop quality and soil chemistry.

"A likely scenario is that it will be going into maintenance," said Olson. "We won't eradicate the mussels but hopefully we'll keep them clear."

Groups like the Milk River Watershed Council Canada (MRWCC) are geographically on the frontlines of the mussel threat and work across borders to prevent the species' spread. The Milk River begins in Montana before travelling into southern Alberta, then back into Montana and eventually into the Missouri River system. With much of its flow being directed from another river system—the St. Mary—the Milk River could potentially be at the epicentre of the cascading effects of a mussel invasion, explained MRWCC executive director Tim Romanow. The council encourages private irrigators on the Milk River to inspect their pumps for mussels when they put them away in the fall.

Romanow is pleased with the work the government has done to bolster enforcement and inspections in the province, but he knows the risk is still high in some areas.

"There is a quite a bit of local traffic that will go back and forth from the Tiber Reservoir into Duck Lake and into the Waterton Lakes, which are the headwaters for Milk River and St. Mary's," said Romanow. "Those boats wouldn't be crossing where there's an inspection station."

Above the grade

MORE OBJECTIVE GRAIN TESTING AND GRADING REQUIRED TO KEEP CANADIAN GROWERS COMPETITIVE

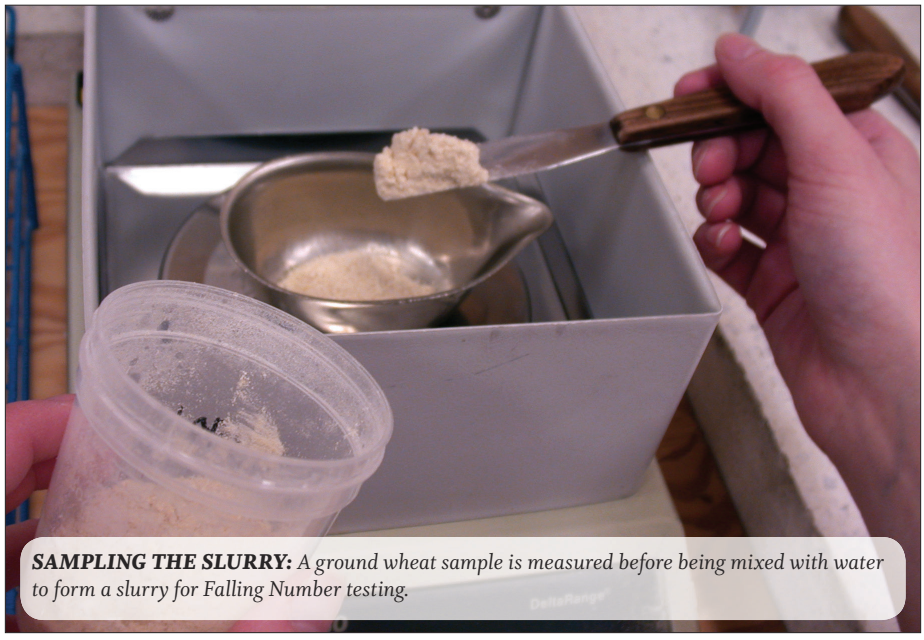
FOR WESTERN CANADIAN GRAIN producers, the 2016/17 growing season saw environmental conditions that were nearly perfect—perfect for a dramatic increase in *Fusarium graminearum* in their wheat crops, that is. As a result, the year revealed several potential drawbacks to Canada's current wheat grading system.

Sarah Foster, president of 20/20 Seed Labs in Nisku, said that beginning in September of last year, her lab began receiving calls from farmers to complain about what they perceived as unfair downgrading and discounting of their grain due to the current testing processes.

"We heard reports that inspectors were seeing spores on the crease of the seed and symptoms of Fusarium on the seed," she said. "But when the grain was actually tested for deoxynivalenol (DON), the next step of the quality assessment, the DON had nowhere near the amount of infection the grader was suggesting there was."

While minimally toxic to animals in small amounts, at higher levels DON can result in reduced feed consumption or feed refusal. When farmers bring their grain in to sell at the elevator, DON levels are estimated through a physical inspection for Fusarium, where kernels that appear damaged are counted. In addition, Falling Number (FN) testing is conducted, also assessing the grain visually for sprout damage that can affect its bread-making quality. Many farmers who have had samples downgraded for sprouting have received independent FN results that indicate good milling quality.

Foster said there have been complaints about these visual—and therefore subjective—tests for a number of years, and more accurate testing methods are needed on site at the elevators to clear up these kinds of issues and ensure farmers are paid fairly for the quality of grain they produce.



SAMPLING THE SLURRY: *A ground wheat sample is measured before being mixed with water to form a slurry for Falling Number testing.*

Photos: Canadian Grain Commission

"These are general quality standards where the physical appearance of the grain is spoiled, but it may not have an effect on the final product," she said. "The Alberta Wheat Commission (AWC) recently said 'enough,' and they are requesting a more scientific way to establish the grade."

Kevin Auch, AWC's chair, strongly agreed that modernization of Canada's current grading system is required to better meet the demands of international buyers.

A grain farmer himself, he understands well the importance of meeting buyer demands, particularly at the export level. He estimates that approximately 80 per cent of the wheat grown on his 5,000-acre farm near Carmangay ends up in the export market. Auch said this number was typical of most Prairie operations, depending on the year.

"If grain buyers around the world are buying the product based on certain criteria, and farmers are not paid accordingly, it makes us farmers less competitive in the long run," he said.

In November of last year, AWC called on the Canadian Grain Commission (CGC) to implement improved methods of testing that would ensure farmers maintain their international competitiveness and receive fair market price for their grain.

Auch echoed Foster's suggestion that the ideal alternative would be to have a scientifically accurate testing method available when wheat is delivered to the elevator that would indicate the actual DON levels in a sample, and therefore the fair price for the grain.

"We realize the potential for technological constraints in regard to this issue, but

if we don't take the steps to work toward something, it will never be accomplished," he said.

Auch added that the current grading system has been serviceable, but AWC feels there is always room for improvement when it comes to keeping Canada competitive. "Any time we can get an analytical, objective measurement to replace a visual, subjective type of grading, it's good for everyone, including farmers," he said.

Auch added that AWC was encouraged last year when the CGC made changes to the acceptable downgrading levels for mildew in wheat samples. "We want the final users of our wheat to have a quality product and to get the best possible outcomes from using Canadian wheat," he said. "If there isn't a good reason to downgrade based on mildew, if it has no effect on the final product, we don't believe in downgrading our price back to the farmer either.

"We're happy the CGC recognizes this and that they made the changes necessary. We applaud them for considering these types of things so that we are not discounted for them when they don't affect the final product."

Still, Auch said AWC aims to ensure that when these types of changes are made, they go far enough.

Foster agreed, adding that she believes downgrading standards could be relaxed even further. "In regard to acceptable mildew levels, we're just trying to align with the standards that are implemented in the United States," she said. "I think they've always been considered the leaders and so we've followed suit to drop from eight to six per cent acceptable levels in regard to mildew. This change is more about standardization than anything else."

Recommendations made at the most recent meeting of the Eastern Standards Committee and Western Standards Committee in November led the CGC to announce its intent to move from subjective visual indicators to more objective analytical testing and grading factors as a new strategic direction.

Rémi Gosselin, manager of corporate information services at the CGC, said the CGC is currently working to establish a team within the organization's industry services and grain research laboratory divisions to advance the initiative.

"This team will be heavily engaged and will work collaboratively with industry producer groups on the path forward," he said. "This initiative involves a significant change in our current grading system and contains many facets and details. It will take significant time to implement. The benefits and costs to all sectors need to be considered."

He added that any changes to the grading system need to be supported by solid science and by both standards committees, as well as all industry stakeholders. "We certainly do want to move in this direction, but it will take time."

Auch agreed with Gosselin's insistence that any changes be backed by science, adding that the reputation of Canadian wheat is paramount. "We sell a great product. Our wheat is second to none in the world and we want to make sure it remains competitive," he said. "At the same time, if we are discounting our farmers without good reason, we want to make sure that stops as well."

DETECTING DAMAGE: *A Falling Number test evaluates the amount of sprout damage in a wheat sample to determine whether it is suitable for milling.*

Old tech, new rules

THE SCIENCE AND ART OF VARIABLE-RATE FARMING

VARIABLE-RATE APPLICATION and farming practices have been an emerging technology for 20 years—an oxymoron to be sure. The technology works, but we still have much to learn about how to best utilize it.

Flash back to 1997: After watching an episode of *Seinfeld*, checking your fax machine in-tray and firing up your IBM PS/2 Model 56SX desktop computer, you pull up the impressive multi-coloured yield maps created using your fancy new GPS-enabled yield monitor. The hot topic in crop production circles is the huge variation revealed by GPS yield maps and how the obvious next step in progressive crop production practices will be to vary fertilizer, seeding rate and other treatments to match the variation in productivity across fields. It was a bona fide no-brainer.

Fast forward to 2017: After 20 years, adoption of variable-rate cropping systems is nowhere near where we thought it would be. What happened?

It's definitely not a technology problem. Almost from day one we have had the ability to use GPS-driven prescriptions to control clutches, sprayer rate controllers and hydraulic drives more effectively. Most new equipment comes with the ability to vary rates. The challenge for variable-rate farming has not been about accurate application technology—that's the easy part. The hard part is creating the right rate prescription for each field, finding the low-hanging fruit, and measuring variable-rate results to know definitively whether that prescription is winning or losing.

It's a classic case of the hardware and software being available before the required agronomy advances. If we could wave a magic wand, we would remove variability—having consistent topography, soil type, drainage and fertility is a farmer's dream, but not the reality for most producers. So, to address variations in productivity, variable-rate technology actually adds another level of variability by treating low-yielding areas differently than high-yielding zones. The logic is sound, and I'm convinced we will get better and better at this, but 20 years ago we thought it would be as simple as collecting data, passing it to our agronomist to generate an iron-clad prescription, and away we go with variable-rate fertility, seeding and spraying.

Photo: iStock Photo

Variable-rate technology is far from new, but the agriculture industry is still trying to find the best ways to put it to work for farmers.

The reality has been that variable-rate farming requires an extremely high level of knowledge of each field. This can be gathered via yield monitors, soil testing, aerial photos and infrared maps from drones, planes or satellites, and topography and soil maps. You can use as many layers or resources as you like, but the objective is to identify simple production zones within each field to separate low-, medium- and high-yielding areas. It takes more than one year's yield data, and this is where your intuitive knowledge of each field becomes invaluable.

Despite our ability to generate and access all sorts of data, veteran precision agriculture specialists say that sometimes the best and most accurate "starting point" production zone maps they see are hand drawn by the producer. They also say that if you as a grower receive a prescrip-

tion map from your agronomist that does not match your knowledge and experience of the field, do not follow it blindly. Simply starting with two or three zones per field is highly recommended.

In the past, adopting a variable-rate strategy for seeding or fertility required a leap of faith. It was difficult to measure the performance of variable-rate systems versus the traditional single rate. Today, variable-rate prescription software can create blocks within each zone to apply your standard seeding or fertilizer rates. This helps assess the performance of the variable-rate program versus a standard single rate.

Interestingly, precision agriculture experts I've talked to say that the most proven and dependable return on investment for variable rate is actually found in GPS-enabled automatic on/off technology to avoid overlap and double application. You have to crunch the numbers on costs for the equipment over the acres you cover, but whether you go with auto shut-off clutches/switches for each seeding row unit or sprayer nozzle, or sectional controls to make it a bit more affordable, you are saving seed and input costs every time you eliminate double coverage. Experience has also shown that there are yield benefits as well, especially on seeding, where doubling up generally results in yield reduction.

The bottom line is that equipment and software available off the shelf make it quite easy to vary seeding and fertilizer application rates. But to really make it work requires effort to accurately identify production zones, determine which input is the best candidate for variable-rate payback for each crop, and commit to continually assessing and tweaking the prescriptions by analyzing data. Variable-rate farming is a management-driven process—not exactly the easy-peasy data-dump-and-go deal we envisioned 20 years ago.

Peter Gredig is a corn, soybean and wheat producer near St. Thomas, ON. He is also a partner in AgNition Inc., a Guelph-based mobile development company focused on building agriculture apps and solutions.

BY MATT HAMILL

Love of the craft

SHARING BARLEY KNOWLEDGE TO ADVANCE CANADIAN MALT AND BEER

AS A 2017 NUFFIELD CANADA scholar, I am about to embark on what will no doubt be the journey of a lifetime. I couldn't be more excited for what lies ahead. Nuffield Canada is an amazing organization that has provided growth opportunities for many individuals who have developed into agriculture industry leaders. I want to thank Nuffield Canada and the Western Grains Research Foundation, which sponsored my specific scholarship, for giving me this opportunity to do work that benefits the barley industry.

The goal of my research is to interview numerous individuals throughout the barley value chain. This includes farmers, maltsters, brewers, distillers, barley breeders and many others in related support industries. My travels will take me to New Zealand, Australia, Brazil and the United States. I look forward to discovering some of the best practices in these countries and how they can be applied to the Canadian system.

These subjects are of interest to me because I, along with my family, have started a micro-malt house here in Alberta: Red Shed Malting. Right now, we are taking high-quality malting barley from my father's Penhold-area farm and processing it into ingredients for breweries in Alberta. Starting and operating a malt house has been a monumental task, and it has led me to incredible conversations with some truly brilliant people across Canada. I've been able to meet some of the barley breeders behind the varieties that have made their way into billions of bottles of beer around the world, and my conversations with other maltsters always end up running longer than expected, as we learn so much from each other's experiences.

One of my favourite parts of the job is talking to the new entrepreneurs who are starting, or have recently started, a brewery. Alberta is in the midst of a phenomenal growth phase in the craft beer industry. Among the owners of these new breweries, passion for the craft and a love of beer are the common denominator, but each individual's story is unique and always interesting. Many of these passionate people got their first comprehensive introduction to the science of brewing beer through the two-year brewmaster program at Olds College, which accepted its first eager students in 2013. It's great that Olds College has such a strong program, and the first wave of graduates are already enjoying success in the industry and receiving well-deserved recognition for their efforts.

I still think there is room for growth in Alberta's craft beer industry. Converting people to craft beer is a quick process when they discover the flavour profiles and other new possibilities that craft has to offer. Others are drawn to craft beer by the benefits it creates for their local community and the agriculture industry.

I see the demand for craft beer—and, consequently, craft malt—increasing, and Red Shed Malting is ready for that growth. That said, there is still a mountain of hard work that needs to be done and several obstacles that could stand in our way in the future. One threat that stands out in my mind is disease. We're very fortunate to be in a region of the province that has had limited issues with Fusarium head blight, and we have worked diligently to keep our farm free of this devastating disease. However, we know it is present in the region now and spreading quickly. When I attended the Lacombe Field Crop Development Centre field day this summer, I saw lots of great research being done to develop resistant barley varieties and educate farmers on crop rotation strategies in order to help combat the spread of Fusarium.

I see a lot of changes occurring at a very fast rate in the industry. Craft beer is proving to be more than just a trend and it delivers benefits throughout the entire value chain. Craft beer uses three to seven times more barley than popular macrobrews, as more of the sugar that gets fermented into alcohol comes from barley instead of adjuncts. These all-grain craft beers are approaching a one-fifth share of the beer market, but the breweries producing them are responsible for close to half of the malt demand in Canada. Based on this, I'm confident that exciting things are in store for the craft brewing and malting industries going forward.

Matt Hamill grew up on a grain farm in central Alberta. He studied at Red Deer College and holds a bachelor of business administration from Mount Royal University. In 2014, he co-founded Red Shed Malting, one of the first specialty malt houses in Western Canada.

BY STAN BLADE, P.Ag.

The sky's the limit

RECRUITING AGRICULTURE AND AGRI-FOOD'S NEXT GENERATION OF INNOVATORS

AS DEAN OF A FACULTY THAT HAS more than 2,000 students (at a university with a population of 39,000-plus) I see the decisions that students are constantly faced with when it comes to their careers. And at a personal level, I have two teenagers who are choosing their first steps on the pathway to post-secondary education and career possibilities. It is a noisy, exciting, confusing environment that they, and all students, face.

What could be more daunting than making decisions about how you will spend a significant portion of your lifetime? Add to that the compelling reminder that specific career choices will establish a student's ability to secure employment and determine levels of compensation, and those decisions become even more difficult. I also hear students expressing their desire to have a job where their work aligns with their values and their employer shares their worldview and perspective on specific topics.

How do we expand the pool of bright, capable people who opt to seek training and career opportunities in the agri-food sector? The Government of Canada estimated in 2013 that the agriculture and agri-food sector provided one in eight Canadian jobs, employing more than 2.2 million people overall. We need people with a wide range of skill sets and interests to ensure our industry continues to grow and reach its full potential. Thankfully, many students who are exposed to the subject matter and the career opportunities that exist get hooked. Our Faculty of Agricultural, Life and Environmental Sciences here at the University of Alberta has the highest number of first-year transfer students of any faculty on campus. Often, students who are enrolled in arts or science programs take a course in our faculty and discover their fascination with nutrition, soils or agribusiness. They see how interesting the courses are and get a glimpse of how they could build a career in agriculture and agri-food.

U of A professor Frank Robinson and his colleagues have come up with a brilliant initiative for our animal science students called the Rural Café. The concept is for students to engage with livestock producers in a "speed dating" format. Our students had the opportunity (in small groups) to interact directly with leading poultry, hog and dairy producers. Students could chat with the owners of a thoroughbred stable, elk farm or bison farm. Many of our students do not come from a farm background, making this their first experience with the people "behind the scenes" of the industry. When the bell would ring for groups to move to their next table, it was a struggle to break up the rich, personal conversations.

There are many things we can learn from other sectors. When the Alberta forestry industry was faced with declining interest in the industry among high school students, the entire sector invested in "Work Wild." This is a campaign that reaches out to students across the province to provide a window into the diversity of employment choices in forestry. Industry representatives visit high schools and talk about the opportunities to work outdoors as an environmental co-ordinator or hydrologist, and describe the need for highly trained engineers to run laser-imaging systems that optimize the value of every tree that enters the mill. They also outline other unique career opportunities, such as aboriginal engagement roles, geospatial imaging specialists and reforestation experts. The agri-food sector already does some great work when it comes to highlighting career opportunities, but Work Wild is an excellent example of targeted investment by industry that is paying off, as we watch the forestry program enrolment increase in our faculty.

Business magazines *Forbes* and *U.S. News & World Report* have identified jobs in agriculture as one of the top opportunities for undergraduate students. Similarly, Purdue University in Indiana and the U.S. National Institute of Food and Agriculture released a report in 2015 that then-U.S. Secretary of Agriculture Tom Vilsack summarized by saying, "there is incredible opportunity for highly skilled jobs in agriculture." When a group of Canadian guidance counsellors from schools in Montreal, Toronto, Vancouver and Victoria visited the University of Alberta last year, they specifically asked to meet with our faculty due to the interests of their students in food security, sustainability and the environmental sciences. The next step is working out how we can directly engage with students and people early in their careers to show how their interests and ideas align with the employment needs and opportunities in our sector.

Stan Blade, PhD, is dean of the Faculty of Agricultural, Life and Environmental Sciences at the University of Alberta.

Global grains

WHEAT WATCHERS WEIGH IN ON YEARS OF MARKET CHANGES

Photos: iStock Photo

Over the last 25 years, international wheat markets have experienced a significant shakeup, changing Canada's top customers and competitors in the process.

AS ANYONE FEELING THE EFFECTS of Father Time will tell you, 25 years brings a lot of changes—some for the better, others not so much. The same can be said for international wheat markets over the past few decades, which have similarly moved forward in some areas and backward in others. In the process, they've presented Canadian farmers and exporters with their fair share of challenges, opportunities and perhaps a glimpse of what lies ahead.

One of the most telling changes has been the makeup of international wheat markets: who's buying, who's selling and who can be described as a major player.

"At one time, the Soviet Union was our top customer," said Cam Dahl, president of Cereals Canada. "Over the years, they have been replaced by countries like Bangladesh—which buys over a million tonnes of wheat from Canada every year—and Indonesia, as well as the regions of West Africa, Latin America and South Asia."

Canada's main competitors have also changed. For example, Dahl pointed to the countries of the former Soviet Union that have gone from being some of our largest customers to some of the largest wheat exporters in the world.

"To me, the most glaring statistic is the percentage of global wheat exports attributed to Canada and the United States," said Brennan Turner, president and CEO of FarmLead, which bills itself as "North America's Grain Marketplace."

That number dropped from 79 per cent in the 1970s to about 27 per cent today.

"It shows you how more evolved producers have changed their game in approaching international trade and supporting domestic production," said Turner. "As well, Russia and the Black Sea countries are leading wheat exporters now, something that seemed far-fetched back in the '80s. That trend of new players in old markets is not going to subside."

Just as the players have changed, so too have the numbers.

According to Caalen Covey, former business development and markets manager at the Alberta Wheat Commission, "over the last several years there has been staggering growth in the worldwide demand for wheat."

That growth in demand has triggered a corresponding rise in production, to the point where we now have a global wheat glut.

"Australia had a massive crop recently, as did the United States over the last couple of years," said Covey. "Canada and the Black Sea countries have been producing a lot as well, moving supply well ahead of demand and driving prices down somewhat."

That doesn't concern Covey, however, who expects the situation to turn around quickly. "The U.S. is already switching out of winter wheat this year because of the carryover from last year," he said.

Like many countries, Canada has boosted its quantity of wheat production, but equally important is the improvement in quality.

"The impact of massive investment in Canadian logistical systems in recent years is considerable," said Dahl. "It starts with how we store grain on the farm, where aeration is now the rule rather than the exception and grain bins feature electronic monitoring."

From Dahl's perspective, the difference between elevator systems 30 years ago and what's on the farm today is dramatic, as are the benefits of that evolution. "Now we can prevent mycotoxin infections and maintain the right moisture level," said Dahl. "The large investment in infrastructure begins at the farm and includes inland facilities as well as upgrades to West Coast capacity. Consequently, over the last 10 years we've significantly improved our ability to deliver the right product to the right place at the right time."

Massive growth in worldwide wheat demand over the past several years has triggered a corresponding bump in production, but Canada has focused on increasing both production and grain quality.

In the past quarter-century, advances in technology have left their mark on every sector of the economy, and wheat markets are no different. This has paved the way for what some call the "commodity casino," where price information and news flow continuously, margins disappear in minutes and risk management is critical.

"I think many farmers are used to the old system under the wheat board, so they don't manage risk the way they should," said Covey.

Because they're used to delivering as soon as possible, Covey said many producers aren't taking advantage of things like forward pricing or timing sales, which would allow them to avoid selling everything in the fall when prices may not be at their peak.

Fortunately for farmers and exporters, the proliferation of new technology has cut both ways.

"The commission has a new information service called PDQ that provides cash grain market price information and related statistical data," said Covey. "It enables farmers in Western Canada to view regional grain prices and gain a better understanding of what's happening in their area."

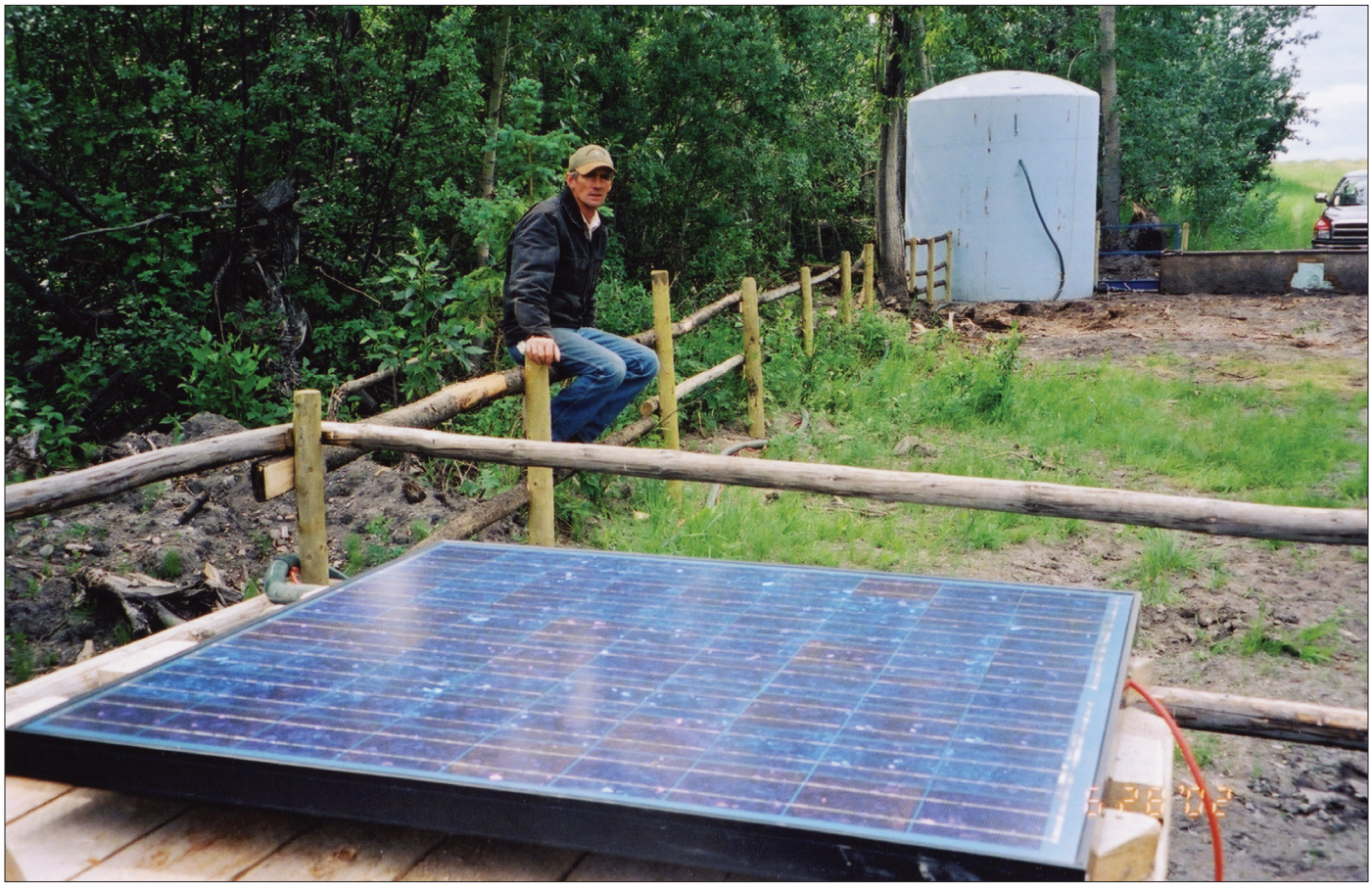
The explosion of technology in this century has led to other opportunities, such as the development of cutting-edge Canada Prairie Spring Red (CPSR) wheat varieties for western Canadian farmers. In co-operation with Cereals Canada, Covey has created a marketing plan to take advantage of the new varieties.

"We want to ensure that when producers raise varieties, there is a viable market for them," said Covey. "Working with exporters, we are trying to align production and increase the number of acres of CPSR so farmers can derive the maximum benefit from yield improvements."

Although much has changed over the last quarter of a century, Turner said there has been one critical constant. "Canada remains one of the largest wheat producers in the world at close to 30 million tonnes per year," he said. "Going forward, trade missions will be more vital than ever to stress the quality of our wheat. Our history as a consistent supplier of good-quality grain is a big reason that we're still a top exporter."

Still, the Canadian wheat industry can't afford to be complacent.

"We must continue to focus on what markets demand," said Dahl. "What worked 20 years ago will not work now or 20 years from now. We need to maintain a resilient industry that can adapt to change."



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A "powerful" story

TODAY'S SOLAR PANELS MAY NOT look a whole lot different than this one—located in a pasture on the Usher Ranch in east-central Alberta—did 20 years ago. However, the technology for pumping water with solar energy has improved, becoming more efficient and more cost effective.

Although specific details for this installation aren't available, solar experts say this appears to be about a three-square-foot, 50- to 100-watt panel used to collect solar energy in a "solar direct" system, powering a pump that delivers water to the storage tank in the background. The flat panel laying on a wooden platform was strictly a summer system. On overcast winter days, once the snow had arrived, it wouldn't be effective, and this storage tank wasn't winterized either.

The technology has developed over the past 20 years, and today's solar panels are more efficient. Also, in more than 90 per cent of modern installations, batteries are used to store power, and heated or heavily insulated tanks or troughs (capturing thermal heat from the ground and water) are used, making it possible for solar-powered watering systems to run year round. A solar panel today would be mounted on an aluminum frame and angled at 45 degrees to catch maximum solar effect in summer, and be set at about a 20-degree angle for winter use.

Back in the day, this system may have cost about $10 per watt, while today a similar system would fall in the range of $2 to $3 per watt.

The Ushers ran a progressive ranching operation near Scollard and Big Valley in east-central Alberta. Tom Usher and his brother Charlie, both born in Scotland, came to Alberta in 1902 and 1903, respectively. Originally, they worked for one of Alberta's first large-scale beef producers, William Roper Hull, on his ranches, but the brothers eventually bought their own operation. Their sister, Eliza Jane Usher, kept house for her brothers.

Tom was a longtime member and director of the Western Stock Growers' Association. In 1990, the Rumsey Ecological Reserve was established on the Ushers' leased lands, and the remaining portion was declared a natural area. The lease was sold in 1999 and the remaining deeded land was sold in 2008.

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