



# THE WORLD-Spectator AG NEWS

JANUARY 2021



Moosomin area farmer Trevor Green has been corn grazing his cattle this winter as an alternative option that helps save money on fuel.

## Moosomin-area farmer moves to corn grazing

BY ROB PAUL

LOCAL JOURNALISM INITIATIVE REPORTER

Moosomin area cattle farmer Trevor Green has taken an unorthodox approach to raising his cattle. Rather than rely on the usual feed like hay or silage he's been corn grazing with his cattle.

"We basically got into corn grazing to eliminate using machinery and fuel every day," said Green. "Machinery and fuel are two of the biggest expenses on a cattle farm and cattle have got feet and teeth and they can go find their own feed."

"With corn grazing, you basically sow it in the spring and then it grows all year long and once it dries down you turn the cattle to it—we're grazing about 78 cattle in there and they're getting about 0.6 of an acre for about a three

or four day stretch.

"On the fourth day we feed them a little bit of hay, they have hay in the morning and that afternoon I let them into the new paddock again."

"It cuts down on having to start a tractor every day and using fuel, the cattle are in great shape and it takes a little bit more mineral and stuff—we use a good mineral program through Moosomin. There's no cleaning cost, the cattle are pooping and peeing out in the field that I need the nutrients in to grow corn for next year again. The cattle go to the feed instead of us going to bring the feed to the cattle all of the time."

Three major factors that have led Green towards corn grazing are its efficiency, the amount it saves on costs, and that less land is needed to raise more cattle on corn. It was

a transition he'd looked into before moving forward with it, but he's happy he did.

"It gives the ability to grow a lot of tonnes on a small amount of acres," he said. "As land gets more and more expensive, we have to look at whether we should buy more land or utilize what we have better by growing more tonnes by acre. It's a 12-acre field and we're feeding 78 cows for roughly 100 days and if I was growing hay on that then I might have 30 days worth of feed on that 12 acres."

One thing that has really stood out to Green with corn grazing is the drastic difference in fuel use. With corn grazing, tractor use is far less frequent and he's using hundreds of litres less of diesel fuel than average this winter.

*Continued on page B5*

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# USask researchers put forages to the test in intensive grazing trial

*A University of Saskatchewan graduate student is combining her love of cattle and her keen interest in forages as she seeks to answer questions many producers are asking about new forage varieties.*

BY LANA HAIGHT

Using two years of data from summer grazing at the Livestock and Forage Centre of Excellence, Master of Science candidate Cassidy Sim is looking at how well new forage varieties persist when grazed at high stock density, which varieties are preferred by the cattle and how the temperament of the animals influence their grazing behaviour.

It's an ambitious, multi-faceted project for Sim, who is co-supervised by Dr. Bart Lardner (PhD), professor in the College of Agriculture and Bioresources' Department of Animal and Poultry Science, and Dr. Diego Moya (DVM, PhD), assistant professor in the Western College of Veterinary Medicine's Department of Large Animal Clinical Sciences. Plant scientist Dr. Bill Biliget (PhD) and animal scientist Dr. Gabriel Ribeiro (PhD) are the other USask faculty members involved in the study.

The goal is to provide science-based answers for cattle producers wanting to establish new adapted forage varieties and implement new grazing practices.

"Some farmers use continuous or rotational grazing just like their dad or grandpa did, but more producers who are trying to expand their farm's management practices are looking at intensive grazing with high stocking density on the pasture. They're using forages in a different way, but we don't have the actual research to show how the forages hold up under this intensive grazing," said Sim.

(You can watch an interview with Cassidy on Youtube, video titled USask researchers put forages to the test in intensive grazing trial, uploaded by USaskLivestockand-Forage.)

Not unlike beef producers in their operations, Sim had to take into account the amount of rainfall when conducting her research.

In the summer of 2019, 69 steers grazed once from July 27 to Aug. 15 for a total of 19 days. The 69 were divided into three groups and each group grazed a 13-acre block with 14 different combinations of forages. Three varieties

of alfalfa and one variety each of sainfoin, meadow brome grass and orchardgrass were blended to form the 14 combinations. With more rainfall in the summer of 2020, Sim managed 149 steers with 49 or 50 in a block. The animals grazed twice from June 26 to July 14 (19 days) and then from Aug. 27 to Sept. 4 (nine days).

In both summers, steers in each block were identified as either bold or shy based on behaviour studies conducted prior to the animals being turned out to the paddocks. In 2019, Sim labelled six steers in each block according to temperament and, in 2020, she increased that to 16 animals per block.

Sim combined real-time observation, driving up and down the alleyway next to the paddocks and noting which animals were feeding and where in the blocks, with drone footage.

"It was really fun to do this research. I'm a little sad that we're done the summer work. The drone is newer technology, at least to us. It was really helpful, but it was also really fun," she said.

Because the 14 different treatment combinations of forages were seeded in strips that did not have fencing, the cattle were free to move from one forage type to another. As she analyzes her observations, she will identify which forages are preferred and determine whether bold animals make better use of the pasture by moving throughout the entire area.

The final piece of Sim's research will be an economic analysis that reflects the cost of seeding, forage yield and intensive grazing in Saskatchewan.

"We will be able to make recommendations based on what we saw, which of these forage varieties are most persistent, effective and efficient. It's information that producers are asking for. They will see something useful come out of this research."

Sim's research is being funded by Saskatchewan's Agriculture Development Fund.

Sim, who grew up in Vanguard, Sask., and graduated from Outlook High School in 2015, is aiming to finish her master's thesis by the summer of 2021. She is excited to begin the next stage of her animal science career. In the fall of 2021, Sim will begin studying to be a veterinarian at USask's Western College of Veterinary Medicine.



Above: Cassidy Sim is analyzing soil samples from the fields where the steers grazed.

Treatments
Foothold alfalfa + Killarney orchardgrass
Killarney orchardgrass
3006 alfalfa + Killarney orchardgrass
AC Mountainview sainfoin + Armada meadow brome grass
AC Mountainview sainfoin
Cronus alfalfa + Armada meadow brome grass
AC Mountainview sainfoin + Killarney orchardgrass
Armada meadow brome grass
3006 alfalfa + Armada meadow brome grass
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With these expansions, the demand for larger grain storage and diversified ag equipment is rising.

In January, Twin Valley Co-op and Valleyview Co-op ag equipment teams finalized an agreement to join forces to lead this region in the ag equipment industry.

"Both Twin Valley and Valleyview Co-op have been in the ag equipment business for years," said Chris Iverson, Agro Division Manager of Twin Valley Co-op.

"Those businesses were built from member's needs; now we look forward to working together as CoopAgEquip to continue providing value to our members while using the collective strength of both retails."

With substantial sales in ag equipment between the two retails, their strength will continue to grow, covering the large geographical area from the US border to North of Russell.

One of their main reasons for working together was their expansion to the big bin industry.

"Whether your grain storage needs are 400 bushels or 40,000 bushels," said Barry Angyal of Valleyview Co-op, "the CoopAgEquip team has what you need. We are excited to continue working with our two manufacturing partners, AGI and Meridian who have both supported the backbone of the ag industry and have been a trusted source for bins and equipment on the farm for years."

There are many options for grain handling equipment in the marketplace as well.

The CoopAgEquip team has conveyors and all types of augers, including truck loading, swing and extend; all with options suited to your needs.

With the increased volume in the equipment business, the CoopAgEquip team will also be able to ensure competitive pricing.

This expansion will further build on the Co-ops brand values, of being locally invested and community minded; a brand that is built on trust, service and shared values.

In order to remain relevant today and show that they are ready for the future, this expansion will help build their communities by providing employment opportunities in addition to their talented sales teams they employ today.

With the co-operation of both retails, the CoopAgEquip team will be better together, stronger

together.

Each retail will continue to serve its own members as far as processing the billing and equity through their home retails.

Dwayne Moncur, General Manager of Twin Valley Co-op and Greg Gill, General Manager of Valleyview Co-op are looking forward to this agreement between their retails, to

secure sustainability and continue their vision to be the retailer of choice for their agricultural customers.

You can follow this new initiative on Twitter by following @CoopAgEquip, 1-877-403-3127 or on the Co-op retail websites [www.twinvalleyco-op.crs](http://www.twinvalleyco-op.crs) or [www.valleyviewco-op.crs](http://www.valleyviewco-op.crs).

Barry Angyal, Ag Equipment Manager, left, and Ray Bilinsky, Rosssburn Agro Manager, right.



Cooperating under one Co-op Ag Equip Team will provide stable, long-term value to Co-op members and their communities.

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CO-OP AGRO

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# Governments of Canada and Saskatchewan invest \$9.8 million into crop research

BY ROB PAUL

LOCAL JOURNALISM INITIATIVE REPORTER

Last week Canada's Minister of Agriculture and Agri-Food Marie-Claude Bibeau and Saskatchewan's Premier Scott Moe announced \$9.8 million in funding for 39 crop-related research projects through Saskatchewan's Agriculture Development Fund (ADF).

"Despite challenges caused by the Covid-19 pandemic, Canada's crop sector has continued to work hard to ensure Canadians and families around the world have access to high-quality products," Bibeau said. "Investing in research helps producers grow the food the world needs in the most efficient and sustainable way possible. These applied research projects will help producers innovate and create growth."

"Saskatchewan's agriculture sector has incredible growth potential and this targeted investment will help our producers and agri-businesses innovate to continue to deliver what the world needs," Moe said. "This investment supports the bold goals in the Saskatchewan Growth Plan that will see our crop production increase to 45 million tonnes, agriculture exports increase to \$20 billion and value-added revenue increase to \$10 billion."

Support for ADF projects is awarded on a competitive basis to researchers looking to examine areas of importance to Saskatchewan producers.

Agriculture Development Fund Crops Project for 2021:

- 15 crop related projects with \$2,589,464 in total funding.
- 11 pulse projects with \$4,488,812 in total funding.
- Six cereal projects with \$1,357,903 in total funding.
- Three oilseed projects with \$864,674 in total funding.
- Three alternative crop projects with \$404,490 in total funding.
- One forage project with \$94,996 in total funding.

The four projects that received the most funding were all from the University of Saskatchewan. Two of the projects are led by Dr. Kristin Bett and focus on enhancing the value of lentil variations for ecosystem survival (\$825,000) and dry bean breeding (\$609,552.80).

The USask project that received the most funding (\$981,150) focuses on pea breeding in Western Canada, it's led by Dr. Tom Warkentin. The fourth USask project is led by Dr. Bunyamin Tar'an and focuses on breeding chickpea cultivars for Western Canada (\$730,317).

In addition to funding provided by the federal and provincial governments, the following industry partners have contributed a total of more than \$3.1 million in funding to these projects: Western Grains Research Foundation, Saskatchewan Alfalfa Seed Producers, Saskatchewan Barley Development Commission, Saskatchewan Canola Development Commission, Saskatchewan Oat Development Commission, Saskatchewan Pulse Growers, Saskatchewan Wheat Development Commission, Alberta Wheat Commission and Manitoba Crop Alliance.

"Sask Wheat has invested \$12.9 million of producer funding through the ADF process since 2015," Sask Wheat Chair Brett Halstead said. "The program provides opportunities for quality, innovative projects that will benefit Saskatchewan grain producers. The ADF funding process allows us to collaborate with other Prairie crop commissions, connect with researchers and fund projects that are developing crop varieties with greater yield potentials and resistance to common pests and environmental stressors. The benefits of farmer-funded research goes beyond farm gate, increasing market opportunities for Canadian crops and leading to a stronger agriculture sector and provincial economy."



\$9.8 million in funding has been announced for 39 crop related research projects through Saskatchewan's Agriculture Development Fund (ADF).

The ADF is supported through the Canadian Agricultural Partnership, a five-year, \$3 billion investment by federal, provincial and territorial governments to strengthen the agriculture and agri-food sector. This includes \$2 billion in federal, provincial and territorial cost-shared strategic initiatives, and \$1 billion for federal activities and programs—there's a \$388 million investment in strategic initiatives for Saskatchewan agriculture.

The cost-shared programs are funded 60 per cent by the federal government and 40 per cent by the provincial and territorial governments and support region specific agriculture programs and services. While the federal government contributes to the funding for these cost-shared programs, the provincial/territorial ministry is responsible for reviewing and approving project applications received under their respective cost-shared programs.

The Canadian Agricultural Partnership will focus on three key areas:

- Growing trade and expanding markets (\$297 million)- Providing core industry services, such as timely market information and sector expertise to help improve the sector's competitiveness, growth and adaptability. Advancing and defending international trade interests, as well as improving market development and market access activities to address emerging needs of the sector, and of small and medium enterprises (SME). This will help expand markets and trading opportunities for the sector.
- Innovative and sustainable growth of the sector (\$690 million)- Enhancing the competitiveness of the sector through research, science and innovation, and adoption of innovative products and practices, with an emphasis on the environment and clean growth. The Government will help support the resiliency and sustainability of the sector, helping farmers adapt to climate change, conserve water and soil resources, and grow their businesses sustainably to meet increasing global food demand.

- Supporting diversity and a dynamic, evolving sector (\$166.5 million)- Strengthening the sector by better reflecting the diversity of Canadian communities, enhancing collaboration across different jurisdictions through a new Regional Collaborative Partnerships Program, securing and supporting public trust in the sector, and improving client services.

year, and take into consideration research commitments from previous years as well as the budget available for new work to benefit the sector," they said.

"All submitted research applications are reviewed by members of the Agriculture Development Fund Advisory Committee, which makes a recommendation to the Minister. The committee is made up of producers and leaders in the agriculture industry.

We select research projects that align with the ministry's strategic goals to increase production, farm cash receipts, value-added production and agricultural exports. We also consider industry needs and which projects will have the greatest impact for producers. Co-funding from industry partners illustrates the extent to which the ministry collaborates with industry to provide funding for projects of strategic importance."

Projects funded by the ADF are focused on all aspects of crop research with an emphasis on improving the efficiency and quality of products produced in Saskatchewan.

"The funding we provide for research addresses short, medium and long-term needs of the agriculture industry," they said. "We're focused on projects that explore new ideas and will have the biggest impact on the industry. For example, a project at the University of Saskatchewan will gather soil fertility data from cropping lands using near-infrared mapping technologies already available, with the goal of predicting crop yields. Another example is a project that explores how to enhance the value of lentil variations for ecosystem survival. This work aims to improve visual, nutritional and processing qualities of lentils using the latest genomics and molecular resources which will lead Canada to capture emerging market opportunities."

The Government of Saskatchewan has invested millions of dollars into different areas of crop research to help the province continue to be a leader in the Ag industry.

"Research and innovation are priorities for the Saskatchewan government," they said. "The ministry has a research budget of \$32.9 million in 2020-21, a \$1 million increase from 2019-20, to support development in these areas."

"It is invested according to the ministry's research priorities which include support for: research and development institutions, research scientists, research and development projects, and commercialization and technology transfer."

"Investments in research help make Saskatchewan producers more profitable and more productive while increasing the competitiveness of our industry," they said. "Ultimately, research will help our producers meet the Saskatchewan Growth Plan objectives of increasing crop production to 45 million tonnes, increasing agriculture exports to \$20 billion and increasing value-added revenue to \$10 billion."

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Trevor Green has found on top of the costs he saves on fuel by corn grazing his cattle, he's been able to get his family more involved on the farm with helping him out when he needs it.

# Moosomin area farmer moves to corn grazing

Continued from front

"Some guys use straw, some use silage, or hay bales," he said. "Unless you're bail grazing—which we're probably going to start doing here in a week—you're starting a tractor every day and taking that feed out to the cows. If you're feeding silage, you're generally starting two tractors—you've got a mixer wagon and a loader tractor—and it's a lot of fuel.

"So far this winter I've used about roughly 60 litres of diesel fuel, guy could be upwards of 300 or 400 litres on 78 to 100 cows. With that tractor running every day feeding bales and then you've got cleaning costs come spring and summer, it adds up."

After looking into corn grazing for some time, Green decided it was something he would like to try out. An unintended positive impact to come out of moving to corn grazing was easily being able to involve his family in helping out when he needs a hand.

"I took a little bit of it when I went to college, the Western Beef Development Centre is a huge resource for trying different stuff," he said. "They've been doing it up there and a couple years ago we thought we should just try it and see it how it works. It's nice because if I'm not available or I'm helping a neighbour or something, my wife Cindy can come home from work and her and the kids with the quad can go move the fence. Some people can be intimidated by a tractor and she can fire up the

quad and grab the kids and they can go help. They can move the fence in like 20 minutes and the cattle are good for another three days. It's good for the whole family, the kids get to be involved!

"My son is six years old and he can go help move the fence, well what can you do if you're choring with the tractor? He can ride in the cab and do nothing. So it kind of gets the whole family involved and I like it that way, getting everybody to contribute a bit. Even in the deep snow, the leaves and the cobs are so high on the corn—there's places out there right now where the snow is over two feet and the cows can just plow right through it and go find the cobs and the leaves. It doesn't seem to bother them and it's cattle's natural instinct to go out and graze. If they can graze on the corn—I'm a Union Forage rep now so we're going to put some swath grazing in—then next year our idea is we can graze the cattle for 10 or 11 months of the year and there will only be a month where we actually take bail to them."

Green plans on corn grazing again next year too while exploring swath grazing which will help extend the grazing period and continue to reduce the cost and time for harvesting forage and cut down on machinery use for handling feed and manure.

"The swath grazing will have a bunch of different varieties in it (Goliath forage rape, Hunter leaf turnip, green globe turnip, millet, forage peas)," he said. "Then with

the corn they'll go graze it and our cows this year will be done in a few days, but next year hopefully we'll go right into the middle of February with corn grazing. It's just a different way of doing things and the margins are pretty tight on a cattle farm and everything we can do to save money is money in the bank."

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# Is it better to buy or rent farm land?

BY MATT MCINTOSH

Land is always an expensive investment. And knowing if it makes more sense to buy or rent depends on your business goals. But first consider, will a new field truly make the farm better?

### ASSESS THE TOTAL COST PER ACRE

While the temptation to purchase property can be strong, Jeff Walkeden, an FCC Senior Relationship Manager based in Saskatchewan, says owning land generally makes sense over the longer-term. But that ownership should not harm the rest of the farm. To determine this, you need to spread the total (potential) purchase cost over a farm's per acre income.

"If those land payments put the viability of the farm in jeopardy, you need to question that decision," Walkeden says. This is particularly true as land prices continue to rise.

"Prices on paper compared to production results rarely make sense anymore. It comes back to the whole farm, and how much can that farm afford to eventually own that piece," he says.

Once you establish a per-acre cost, you can compare it to rental expenses. In some cases, taking the latter course will prove much more suitable. Longer-term rental agreements can also help eliminate variability.

### AVOID PROJECT LAND

If buying property is financially viable, Walkeden says farm owners should ensure the parcel in question has the right qualities. This includes but isn't limited to being in the right location for the current business and good, or good enough, soil quality. Knowing the parcel's history through previous years of renting the ground, for example, also helps.

Consider whether a land purchase will really improve business.

"Check off as many boxes as you can to make sure it makes sense, to begin with. If you know it well and it produces well, it



might be better to buy," he says.

"A farm can only have so much project land in their land base. If all you're doing is buying project land at high prices, is it going to work out in the end? If it's land you know very well, then it helps make the decision a lot easier."

### OWNING FOR RETIREMENT AND SUCCESSION

You can use land ownership to accrue wealth for retirement, as well as for succeeding generations taking over the business. It can also be leveraged in cash-flow management.

Regardless, Walkeden reiterates the cost of ownership, high as it often is, must not place undue hardship on the farm's ability to succeed.

"If there's uncertainty, I have to ask if it's good to take on these debt payments."

### BOTTOM LINE

Deciding between renting and buying land depends largely on a farm's business goals. While owning land generally makes sense over the long-term, the purchase shouldn't harm the rest of the farm. Other factors, such as soil quality and location to the current farm, should also be considered before purchasing.

There are lots of factors to consider when assessing whether to rent or buy farm land.

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# Classroom Cattle links students with ranchers

Students across the country have the opportunity to learn firsthand about beef cattle production from a young rancher dedicated to enhancing agricultural knowledge

Classroom Cattle, a new Canadian Ag Education program, allows the virtual adoption of a calf from Mortenson Farms Ltd. for the school year. Half of the classrooms get to virtually adopt and follow the development of a heifer calf and half

virtually adopt a bull calf. Founded in the fall of 2020 by Julie Mortenson, the first year of Classroom Cattle involves roughly 1280 students from 61 classes - 53 from Saskatchewan, four from Alberta and four from Ontario.



Julie Mortenson with her cattle

Plans are now underway for year two. Mortenson Farms Ltd. is a grain and beef cattle operation located near Nokomis, Saskatchewan where Julie farms with her husband and his family. "Participating classes receive physical learning materials such as ear tags and feed samples, as well as monthly updates on the life of their calf," explains Mortenson. "One fieldtrip per class per school year to the farm is also included: although, due to current pandemic restrictions, this year's field trips are all being conducted virtually through Zoom which still allows the ability to interact in real time and answer questions from the students."

Virtual farm tours will remain an option for any class unable to make the journey to the farm in person. Sign-up for Classroom Cattle opens to Canadian teachers in September each year and the program runs from October to May. Mortenson intends to have the program remain free to classrooms through industry sponsorship and fundraising. Currently, funding support is coming from the Saskatchewan Cattlemen's Association and the Canadian Agricultural Partnership Awareness Initiative along with some resource partnering with 4H Saskatchewan.

"The goal of the program is to connect children from across Canada with a Verified Beef Production Plus ranch in order to inspire curiosity and trust in agriculture and food production," says Mortenson. Sign up for the 2021/2022 school year will open in September 2021.

Interested teachers can contact: Julie Mortenson at juliemortenson@hotmail.com

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# RCMP investigate major cattle theft at Moosomin

## Cattle worth about \$100,000

Between October and December of 2020, a local farmer had 63 animals—35 cows and 28 calves—on multiple sections of land between Moosomin and Fairlight go missing. The value of the stolen cattle is about \$100,000.

This incident is being investigated as a theft, according to Cpl Dallyn Holmstrom of the Moosomin RCMP. All the cows were branded with a bar over TE.

Livestock Services are assisting with the investigation, and will know if any of these animals hit auction marts.

The 35 cows consisted of 22 black and white and 13 red cows.

The steer calves have green ear tags, the heifer calves have yellow ear tags, and the calves aren't branded.

Anyone with any information about the cattle thefts is

asked to call Moosomin RCMP AT 306-435-3361 or Saskatchewan Crimestoppers at 1-800-222-TIPS (8477).

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# USask researchers awarded funding to improve agriculture practices

BY ROB PAUL  
LOCAL JOURNALISM  
INITIATIVE REPORTER

Eighteen wide-ranging University of Saskatchewan (USask) crop research projects have been awarded a total of nearly \$5.8 million through Saskatchewan's Agriculture Development Fund (ADF), a program jointly supported by the federal and provincial governments and supplemented by industry partners.

Innovative research into disease resistant and nutritious crops, human health applications of cannabis, biodegradable plastics made of plants, and tracing the carbon footprint of an agricultural operation are among the USask projects supported by the program, which also attracted almost \$1.9 million in total industry funding for the teams.

"This major investment in USask research is indicative of the key role the university plays in growing Saskatchewan's capacity as a world leader in the agricultural sector," said USask Vice-President Research Karen Chad. "The adoption of new agricultural technologies and creation of competitive, value-added products has the potential for real-life benefits, including new jobs and increased economic prosperity for the province."

The ADF program is supported through the Canadian Agricultural Partnership, a five-year \$388-million investment by the federal and provincial governments in strategic initiatives for the sector in Saskatchewan. A total of \$9.8 million was announced January 12 for 39 agricultural research projects in the province and across the country, of which more than half were awarded to USask.

Major USask projects awarded funding include:

- Strengthening pulse crops in the field and beyond: More than \$1.4 million has been awarded from the ADF program to USask researcher Kirstin Bett for two projects:
- 1. Improving lentil quality and nutritional value by borrowing traits from wild lentils and developing new computerized imaging technology to target desirable seed characteristics. The results will lead to higher value lentils, and access to new, specialty markets for produc-



USask plant scientist Dr. Kristin Bett was awarded \$1.4 million in funding for two projects, one focused on improving lentil quality and the other developing bean varieties (credit: Debra Marshall Photography).

- 2. Developing high-yielding, disease-tolerant dry bean varieties. The results will provide new, high-value pulse crop options that are well-suited to irrigation.
- Developing high-yielding chickpeas: Plant researcher Bunyamin Tar'an will use \$730,000 from ADF to develop high-yielding, large seed kabuli chickpea varieties suited to Western Canada. The results will lead to new chickpea varieties, benefiting Saskatchewan's producers and broader economy. Tar'an will also receive \$236,000 from ADF to study how using genetic diversity from wild chickpeas could help combat Ascochyta blight, a major disease threatening chickpea production across Western Canada.
- Breeding healthy peas for Western Canada: Tom Warkentin, Saskatchewan agriculture ministry's Strategic Research Program Chair in Pulse Crop Breeding and Genetics, was awarded the largest single-study award from ADF this year—more than \$981,000—to develop high-yielding, root-rot-resistant pea varieties. Root rot, a disease widespread across Western Canada caused by a combination of fungus and other pathogens, can destroy as much as 70 per cent of a farmer's crop during a wet year.

Other innovative crop-related projects with potential economic impact include:

- Finding plant-based climate-friendly alternatives to plastics (\$360,000): Plant scientist Martin Reaney's research aims to create carbon-neutral, biodegradable plastics from canola and pulse products to ease pressures on our oceans and landfills. Reaney is Saskatchewan agriculture ministry's Strategic Research Program Chair in Lipid Quality and Utilization.
- Measuring the carbon footprint of crops (\$230,000): Plant scientist Kate Congreves' research team will establish Saskatchewan's first Greenhouse Gas Monitoring Station using micrometeorological techniques to measure greenhouse gases year-round and determine the net carbon footprint of a canola-cereal rotation. This type of field-scale data is needed to help the industry move forward in a carbon-based marketplace.
- Solidifying cannabis as a Saskatchewan product (\$188,000): Plant researcher Tim Sharbel will study the genetics of a cannabis seed material collection owned by Konetics, a company with ties to the Saskatchewan market. The goal is to strengthen the cannabis industry in the province through vigorous

quality control of agronomic traits, in addition to connecting this material to the Cannabinoid Research Initiative of Saskatchewan for scientifically based studies on applications to human health.

- Heading off disease in wheat (\$410,000): In two projects, wheat breeder Curtis Pozniak will take aim at protecting wheat crops from fungal pathogens by identifying novel disease resistance in wheat strains from around the world, and by pinpointing the mechanisms used by Fusarium head blight—the most serious disease affecting wheat production in Canada—to overcome wheat's defences.

- Removing arsenic with agricultural waste (\$70,000): Engineering researcher Jafar Soltan is testing the use of low-value agriculture residue—such as straw and

meal from canola, barley, wheat, and mustard—to transform it into high-value adsorbents that remove arsenic from mining wastewater. Soltan and his team of experts will engage in research using the Canadian Light Source synchrotron and a pilot project that simultaneously works in two vital economic sectors: mining and agriculture.

The 18 USask projects attracted a total of almost \$1.9 million from a wide range of organizations and agencies including Saskatchewan Pulse Growers (\$634,000), Western Grains Research Foundation (\$588,000), Saskatchewan Wheat Development Commission (\$340,000), Saskatchewan Canola Development Commission (\$186,000), Alberta Wheat Commission (\$72,000), the Manitoba Crop Alliance (\$66,000), and the Saskatchewan Oat Development Commission (\$3,000).

## Crop research to increase efficiency

Two of USask researcher Dr. Kristin Bett's projects received over \$1.4 million in funding through Saskatchewan's Agriculture Development Fund (ADF) with both focused on examining crops and learning more about their traits to develop differing varieties.

*Continued on page B10*

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# USask researchers awarded funding to improve ag practices

Continued from page B9

"The big one is called EVOLVES (Value of Lentil Variation for Ecosystem Survival), it's a lentil Genome Canada grant that we received just over a year ago and this is the provincial contribution to that larger \$7.5 million project that we're running. It's a followup to a previous Genome Canada project we had that ADF also co-funded, and so the new one has got a genomic component, but what's more interesting to the general public is that the genomic part of it all has to do with quality traits.

"The idea being that we need to stay ahead—there's a whole issue in Kazakhstan where they're basically pilfering our genetics and then selling to our customers at a lower price because they're closer. To get away from that, the idea of being in a position to stay ahead of them with quality genetics, but also start to look more at instead of bulk shipping focusing more on value added aspects. Can we develop the genetic know-how to very quickly and nimbly put together packages of genes in a variety that would give you the right size, shape, colour, B vitamin profile, protein content—there's a whole range of different traits that we're interested in look at the underlying genetics for."

With the project studying lentils, Bett says they want to get a better understanding of the crop's makeup so they're able to know earlier how it will develop and what type of quality it will be, therefore making the process more efficient.

"The overall goal is to look at phenotyping and genotyping," she said. Phenotyping is looking at different characteristics of a diverse set of lines. So we're looking at that, but we also have the underlying genotypic information.

"We're sequencing genomes so that we know all the genes that are in these and the idea is that we hope to take the phenotype and using fancy math you can put the two together and try to identify the region of the genome that contain genes that are controlling those traits. For instance, in lentils you can have yellow or red on the inside and that's a single gene—we've known that forever—but can we figure out what is that controls that genetically?

"It's not super critical, but what it will do is then allow us to figure out how to get redder lentils because the pasta industry wants them to be super dark red, they don't want the yellow/orange, they only want red. So can we figure out how to get really red lentils?"

"Plant breeding is a long process, but if we can shorten the time frame to developing varieties that have the traits that the buyers are interested in—one way would be using molecular markers and the actual genotype rather just what it looks like to be a little bit quicker.

"We can screen material early on and get rid of the stuff that will be garbage. Basically our whole game is to throw away the bad stuff—the sooner you can throw away the bad stuff, the better because you're not wasting any other resources on it and then you can focus your efforts on the ones that are good and then maybe you can segregate for other traits you don't know about and then you can pick from amongst those. Efficiency is the whole goal—we want to increase the efficiency and effectiveness of the breeding program."

The government funding was vital to moving the lentil project forward and Bett couldn't be happier.

"If we hadn't gotten this then not only would we have been out that amount of money, but we'd actually be out twice as much because with Genome Canada you have to find 50 per cent of the funding," she said. "We would have been out basically \$1.6 million, not just the \$800,000 for this project. So it's a big deal, you don't know how

much dancing went on the day we found out about it!"

With the bean project funding, Betts is hoping through research they'll be able to breed crop varieties that are higher quality and without the funding the project never would have gone forward.

"Our other project has to do with breeding," she said. "We actually had three of them come to our department—bean breeding, pea breeding, and chickpea breeding. We used to be funded up front by Sask Pulse Growers and in exchange they would get royalty-free varieties and there's biological reason as to why it was set up that way 20-plus years ago. But that model isn't as effective nowadays and there's more encouragement to have other players involved so we're switching to a model where the varieties will be royalty bearing, possibly, depending on who's partnering with us in the future.

"What we need is transition funding in order to get onto a new model and I think in all cases 75 per cent is ADF funding and the rest of the 25 per cent in my case is coming from Sask Pulse Growers. I would have had to shut the breeding program down without the funding. We don't have incoming funds at the moment because everything was royalty-free before—we do get some from international sales, but not enough to run the program so it was important to get this."



## Designing resilience into your farm operation

BY KIERAN BRETT

Looking ahead to 2021, some Canadian farm producers are wrestling with their relationship with risk. While 2020 was the year of Covid-19, recent years have also focused attention on risks associated with climate change, trade-partner disagreements and changing consumer demands.

How can producers deal with risk in challenging times? Eric Olson, national lead of farm management consulting with accounting and advisory firm MNP, says many clients wonder about this topic. Olson advocates an approach to risk management planning that starts with asking, exploring and answering these four questions.

### What's your tolerance for risk?

"The reality is, the business of farming is risky," Olson says. "Farmers are used to risk and have more tolerance for it than most people in society. Among farmers as a group, though, different people have different comfort levels. That's a good place to start the discussion."

### What risk are you most concerned about?

It could be a major drop in market prices, a no-crop year for grain farmers or a serious disease outbreak for livestock producers. And it could be more than one risk coming up at the same time. Is this risk part of a regular cyclical downturn, or is it a once-in-a-generation disaster? How likely do you think it is to occur, and how bad would things get if it did?

### What tools are available?

Different sectors and provinces have different risk management tools for farmers to access. Being aware of what's available is important. Would the tools address the risks you identified? Tools include programs like AgriStability, crop insurance or forward-pricing to reduce price risk.

### How would you cover a revenue shortfall?

"The shortfall is the difference between your expenses and what the risk management tools will bring in," Olson says. "That is what you need to be able to fund out of your operation."

The discussion then turns to cash flow and working capital. If the farm has enough liquidity, or can sell surplus assets readily, it can weather whatever risk the producer envisions. If the funding shortfall can't be met, the farm business would have a big problem. This gap can be addressed in the coming years, with resilience-building prioritized in farm decision-making. In the short term, being able to access a line of credit or other emergency financing can help the business get through tough times.

"We want to empower our clients to make good decisions with all the information at their fingertips," Olson says. "Things are challenging for many farmers right now, but they can take steps to bullet-proof their operation over time."

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# Lentils first breakthrough in CDC history of re-shaping Prairie agriculture

BY KATHY FITZPATRICK

It's hard to imagine what Saskatchewan's pulse industry would be like today if the University of Saskatchewan's Crop Development Centre (CDC) had never been created.

The CDC has "played a very important role in helping to foster the growth of the sector here in Saskatchewan," said Carl Potts, executive director of Saskatchewan Pulse Growers (SPG).

Lentils, an inexpensive and nutritious source of protein, are Exhibit A in this success story. Nearly all the country's production comes from Saskatchewan, and Canada is the world's top producer and exporter.

2020 was a banner year for lentils: the volume of Saskatchewan's lentil production shot up by almost 26 per cent over the previous year, overtaking oats, while seeded acres of lentil increased by more than 12 per cent.

But when pea breeder Al Slinkard arrived at the CDC in 1972, lentils were almost unheard of as a viable crop for Saskatchewan. Slinkard stood that notion on its head, and for that he was bestowed with numerous awards. In November of 2020, he became an honorary member of the Order of Canada.

When Slinkard arrived from the University of Idaho, a global wheat surplus had driven prices down and there was a need to diversify. Slinkard learned of a couple of Saskatchewan farmers who had tried growing lentils unsuccessfully. On top of that, the price was "ridiculous", Slinkard recalled: four cents per pound.

But in 1978, the year the Laird lentil Slinkard developed was released, the Palouse area straddling Washington and Idaho states suffered an "unprecedented drought", he said. Buyers turned to Saskatchewan, and the average price shot up to 35 cents per pound.

Bruce Cheston, a farmer in the Grand Coulee area west of Regina, had grown two fields of lentils with a yield of 1,800 pounds per acre, grossing more than \$600 an acre, whereas the wheat grower across the road (would be) "lucky to get \$100," Slinkard said.

That winter Slinkard criss-crossed the province giving talks to farmers three or four times a week, finding an eager audience. By the late 1980's, Slinkard was able to report that the Laird lentil "is the most widely grown lentil variety in the world."

The large-seeded Laird was quickly followed by Eston, a small-seeded green lentil, released in 1980.

Producers threw their support behind the CDC. "Growers at the time recognized that in order to have a successful and growing industry, they needed to make investments in support of breeding," Potts said. Since 1997,



Research and innovation by USask scientists has been the key to Canada's global success in pulse crops, with a great measure of credit going to Al Slinkard who paved the way.



Crop Development Centre molecular pulse breeder Dr. Kirsten Bett and pulse pathologist Dr. Sabine Banniza examine lentil plants growing at the College of Agriculture and Biore-sources greenhouses.

SPG has invested more than \$60 million at the CDC in support of plant breeding and related research including genomics.

Today, not only does Saskatchewan's pulse industry enjoy global reach, so does the CDC's ongoing research into pulse crops.

An international team led by CDC plant scientist Kirstin Bett has developed a model for predicting which lentil varieties are most likely to thrive in new production environments. It's vital information for producers and breeders as they strive to address climate change and feed the world's growing appetite for inexpensive plant-based protein.

Working with universities and organizations around the world, the team planted 324 varieties in nine production hotspots throughout North America, South Asia, and the Mediterranean. The findings have been published in 2020 in the journal Plants, People, Planet.

The CDC's Bett and Bert Vandenberg are also working with the genomic big data company NRGene, based in Israel but with an office in Saskatoon, to sequence several of the world's major crops.

In 2017, the partners reported they have successfully sequenced two wild lentil genomes, information that will further breeding efforts to enhance yield and quality. That work is part of a \$7.9-million Genome Canada-funded project to apply genomics to "innovation in the lentil economy."

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# Life down on the farm

I don't understand how painlessly this could have happened but we have made it (nearly) through the entire first month of the year rather quickly or so it seems. How can that be? We are Covid-19-stressed, Covid-19-unable-to-gather and Covid-19-don't-go-anywhere, yet still, the days go by and those days become weeks and voila! Month end is on the horizon.

Don't get me wrong. I understand this isn't the case for everyone—it can be a real struggle in times like this to stay on the cheery side of life, especially at this time of year; I too miss family get-togethers around my dining room table just like everyone else; I too miss being able to plan a mini-vacay or a big one for that matter. There have, however, been some really good times with small groups of family at the tobogganing hill or at the fire pit at the creek or, like last week in Kipling, at the outdoor skating rink.

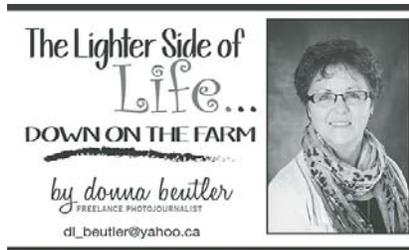
Such was the case the other day in fact, when I met my daughter there and sat around the fire with one of my granddaughters as her two cousins spent the afternoon skating and spinning on the ice. A warm fire, hot chocolate and snacks made for a most enjoyable afternoon even though I must admit I had a bit of trouble getting the fire going. As I lit yet another match, I was reminded of one of my playschool students many years ago who, at the age of three, responded to my question about what the first thing we would need to start a fire. Expecting to hear "wood" or "logs," I had to try very hard not to laugh when this wee little blonde-haired girl with the hugest smile immediately shouted out the answer: "gas." I can't say I wasn't wishing for some accelerate during my fire-starting struggle with the very damp, snow-covered logs.

After one entire roll of paper towel that I happened to find in the truck and after nearly every match in the book was used up, I still wasn't having much luck. My granddaughter (11) was sitting across from me, working on her 4-H speech in a coil notebook, so I asked if I could borrow the notebook, turned it toward the back and ripped the last three or four pages out of the book. The shocked look on her face said it all: I had just torn her 4-H speech out of the book.

"I am so sorry, I never even looked," I said, bumbling my way through my apology amid my impromptu tearing out of the pages. I have no idea, of course, how her speech reads now but I wouldn't be surprised if it starts out like this: "I was watching my cousins skate and was working on my 4-H speech one afternoon at the outdoor rink while my Auntie and my Grandma tried to get a fire started when all of the sudden, my Grandma tore my 4-H speech out of my notebook and threw it on the fire."

Eventually, with the fire going, and the marshmallows ready for roasting, my granddaughter, continuing to work on her speech, told us it was a bit of a bummer that she had had to sell her cow (former 4-H calf), Princess.

"Why did you sell Princess," my daughter asked her niece. "Because she was open," was the response. "Open?"



my daughter responded, "what do you mean open?" At that point, this young 4-H'er and I absolutely lost it. How could I have raised my daughter on the farm only to hear such a question from her. To be fair, we were grain farmers and didn't get any cattle until after the kids were grown and gone from home. But still...

As the finer details of "openness," were explained to this mother of three, I couldn't help but think of how farm knowledge by osmosis just seems to occur naturally when you are a "cattle-farm kid."

Our chatter continued and I asked how egg-gathering was going out at the farm. The answer from my "farm" granddaughter went something like this: "I don't know how many we get every day," she said, "I don't go in there, not with Joe in there!" Ahhhh, Joe, the rooster, the husband of Zoe, the very reason I don't go in the chicken house. That rooster is crazy. I did, however, go into the chicken house with my camera the other day (as suggested by my husband who had been in there earlier). And there, sitting up in the rafters of the little chicken coop was an owl. I at first thought it was a plastic owl, placed up there by the twins for whatever reason. That was until it flew out through the door I was standing in. Whew! Nearly took me out but a quick move on my part meant only his wings brushed my shoulder. That was a close brush with feathers, let me tell you!

The month of January is not only a darker, drearier, colder (usually), windier month, it is also the month of trying to finish up year-end books, in my case for our farm and for my graphic arts design business. I should clarify. Technically January is the month. Sometimes it ends up being more March-ish.

This past year, between hip surgery recovery and Covid-19 and consequently its time-producing effect, I have proudly been able to say, every month, "My farm books are up to date!" And so, around the first of January, with the Christmas tree already taken down and the decorations all neatly stored away, I continued working on the books, determined to surprise my accountant with a Feb-

ruary 15 appointment as opposed to an April 15 one. He was going to be amazed!

It just so happened, however, that as I was making my December entries the power flickered for a nanosecond and I had to reboot my computer. My old, old computer that has one thing left on it—the old, used-since-forever accounting program on which my farm books have been stored forever. Not backed up, not that it mattered because did the power surge fry my computer? Nope, it is just fine! You should see my accounting program though. Beep, beep, beep, Quickbooks has encountered a fatal error. Fatal? Seriously I say to myself, fatal?

A call to my tech guy nets me: "No, Donna, I don't think the laying on of hands is going to restore your program to you." Okay, so that's not quite what he said, but you get my point. And he was right. No amount of rest seems to aid in the recovery of this program.

"You know," I said to my husband, "it's time for us to step into the next century and purchase an online subscription to do our farm books on. The monthly cost isn't exorbitant," I say as I cringe (not loving that everlasting monthly charge to my credit card). My old program probably cost me a hundred bucks total and has served me well for some 20 years.

Being that doing up the books and filing income tax isn't exactly optional, I hit the "purchase now" button, knowing I was going to hate setting up a new program. And I am. Not only that but I was really itching for a Pepsi, though I have pretty much renounced it totally for the past year. And every time I open that new QB program I want to reach for an ice-cold, sweet, caffeine-filled can. It's a good thing I draw the line at driving two blocks to the store to get one.

This Covid-19 lockdown business has caused us to be creative, not in a how-can-I-get-away-with-something manner, but in how can we connect in outdoor ways with a couple of others, at a distance, around a fire. It's not ideal but it is what it is and though I hate everything about it, I am willing also to do my part to the best of my ability to help keep my family and my community safe.

As the calves are now coming, though not in great numbers since the herd has been downsized, I am eternally grateful that I am not living in a high-rise apartment in some big city because it's pretty sweet for me to be able to hop in my half-ton and head out to the farm or the tobogganing hill or the creek and enjoy watching the newborn calves or the kids on the hill or whatever the day may bring. Here's hoping y'all are making the best of this challenging time in our lives. Until next time, keep doing what you do best and enjoying every blessing that comes your way!



Right: The owl in the chicken coop



Above and left: Here is a "farm" kid at our tobogganing hill. Can you tell by the Carharts and the calf sleigh toboggan?

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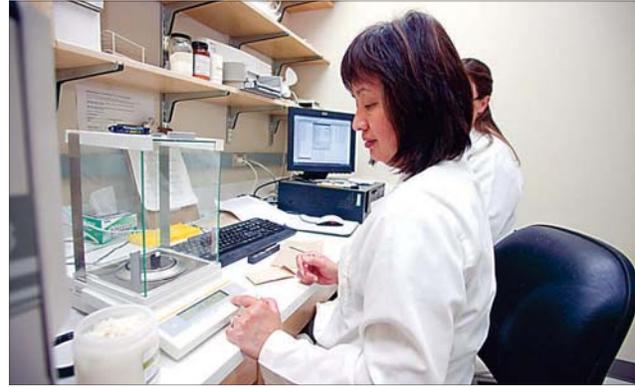
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CDC researcher Shuhua Zou works in the Crop Development Centre's Grain Innovation Lab in Saskatoon. Her work supports the CDC's spring wheat and canaryseed breeding programs, led by Pierre Hucl.

(Photo: David Stobbe for USask)



Mandy Mac, researcher in the Barley and Oat Breeding program at CDC, in the Grain Innovation Lab.

(Photo: David Stobbe for USask)

## USask's CDC celebrates a half century of crop innovation

BY KATHY FITZPATRICK

A scan across the horizon reveals how much Saskatchewan's agricultural landscape has changed in half a century: millions of acres of ripening lentils, fields of sky blue flax, and stubble poking through snowy expanses, ready to receive spring-time's direct-seeded crop.

Much of the credit for all this goes to the Crop Development Centre (CDC) at the University of Saskatchewan's College of Agriculture and Bioresources. Launched in 1971 to help producers diversify and farm more productively and profitably, the CDC celebrates its 50th anniversary this year.

"Over half a century, our renowned CDC research has supported producers and agribusiness, helping to make the province a world leader in agriculture," said USask Vice-President Research Karen Chad.

The CDC has released more than 500 new crop varieties—an average of 100 for each decade—which CDC Director Curtis Pozniak calls "remarkable." It's the work of dedicated people in a research centre that today includes over 200 staff and graduate students, with expertise not only in plant breeding but also research into crop diseases and end-use quality.

Depending on the crop, improved traits include earlier maturity, higher yield, and disease resistance. CDC research has substantially reduced the heavy metal cadmium taken up from the soil into durum grain.

Saskatchewan now leads the world in exporting peas, lentils, and chickpeas—staple foods in fast-growing countries such as India, China, Bangladesh, and northern Africa.

The CDC's Pierre Hucl developed the first hairless canary seed which has helped make Saskatchewan the world's leading producer and exporter of canary seed, with exports of \$100 million a year.

And more recently, the CDC has led some global science breakthroughs such as cracking the wheat genetic code.

A combination of plant breeding expertise, facilities and land—all in one place—has made the CDC "the greatest plant breeding and crop development organization ever established in Canada," said Emeritus Professor Gordon Rowland, former CDC director and flax breeder. USask's Western College of Veterinary Medicine.

Carl Potts, executive director of Saskatchewan Pulse Growers, stresses other keys to the CDC's success are committed scientists and staff, connected to "one of the strongest agricultural universities in Canada" and centred in the country's major grain-growing region.

Improved production practices such as replacement of summer fallowing with zero tillage was an unforeseen but welcome spinoff for producers. Crop diversification from USask-developed varieties—as well as new seeding technologies for precise seed and fertilizer placement—significantly reduced Saskatchewan acreage under summer fallow, increasing

seeded acreage by more than 40 per cent since 1970.

The results have been three-fold: more land being used to produce food, higher returns for farmers, and more crop choices for producers than ever before. Estimates are that this decrease in fallow land alone has had an impact on the Saskatchewan economy of \$50 billion since 1970.

Over the years, the CDC's impact has been "enormous," said former CDC director Bryan Harvey who developed, along with Brian Rossnagel, the malting barley Harrington which became a leading choice of North American producers.

For every \$1 million invested in CDC plant breeding, producers saw a seven-fold return, according to the CDC's 2016 economic impact report.

From 1991 to 2015, producer profitability across the three prairie provinces increased by \$3.8 billion "as a result of CDC varieties provided to the marketplace," the 2016 report found. There is little doubt the CDC continues to wield an impact of this scale.

Along with investments from the Saskatchewan Ministry of Agriculture (averaging \$5.7 million annually over the 10 years preceding the report's release), millions of dollars in producer checkoffs, royalties, research grants and breeding agreements flow in from industry, producer groups and government agencies, along with significant indirect funding and infrastructure support from USask.

The report also highlighted the CDC's reach in terms of its basket of crops—bread wheat, durum, barley, oats, flax, field peas, lentils, chickpeas, canary seed, and dry beans. From 2011 to 2015, CDC varieties accounted for 37 per cent of the acreage grown for these crops in the three prairie provinces. Some crops clearly predominated: lentils (95 per cent, dry peas 85 per cent, flax seed 83 per cent, chickpeas 75 per cent, and canary seed 73 per cent).

The CDC has set a course for the future with a new vision—to be "a world-class crop improvement centre that delivers crop genetics for society."

In 2019-20, the centre carried out 116 research projects worth more than \$30 million, including \$7.7 million for two large Genome Canada projects involving lentil and wheat.

CDC scientists are global leaders in the application of genomic research to crop improvement, having worked on sequencing the genomes of pea, chickpea, oat, tepary bean, and flax genomes.

Genome sequencing involves developing a DNA blueprint of the varieties used in breeding. "This gives scientists and breeders access to powerful DNA testing tools that can be used to improve efficiency in selection," Pozniak said. For instance, if breeders can identify a gene that causes disease resistance, they can then develop a DNA tag ("a little fingerprint") to select for that trait during cross breeding and aid in creating new and better varieties.

Pozniak's team and Andrew Sharpe of the USask Global Institute for Food Se-

curity have played a key role in two major international consortia—one that sequenced the bread wheat genome, which is five times the size of the human genome, and another that sequenced the entire genome of durum wheat, the source of semolina for pasta.

In 2020, Pozniak led an international consortium of 95 scientists that sequenced 15 different wheat varieties bred around the world—the most comprehensive atlas of wheat genome sequences ever reported.

Kofi Agblor, who led the CDC from 2012 to 2019, foresees the ongoing importance of genomics as a platform for improving crops like wheat. "I think the best is yet to come," he said.

Resistance to disease, pests and drought remain important goals at the CDC, especially in the face of climate change. But

crops must also adapt to changing market demands, as world population rises while consumers hold out for choices that are healthier and more ecologically sustainable. Crops must also evolve to suit changing production and processing methods.

"As plant breeders, we have a lot of traits to consider and balance when creating new varieties," Pozniak said.

It was a changing world that led to the CDC's creation in the first place. In the late 1960s, a global glut drove down the price of wheat, the crop Saskatchewan farmers relied on most heavily. This prairie farm crisis provided the rationale for a bigger push in agricultural research, particularly in Saskatchewan which lacked a major plant breeding centre.

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# USask's CDC celebrates a half century of crop innovation

Continued from page B13

In its 1971 funding application to the National Research Council (NRC), the university made the case that with agricultural markets changing rapidly, prairie farmers had to diversify and lessen their dependence on wheat, while at the same time improving traditional crops (wheat and barley in particular) to meet world demands.

Another driving factor was that the crop science department was searching for more money to conduct research, hire staff, and attract graduate students. Given that Saskatchewan has almost half the arable crop land in Canada, the crop science department was "way understaffed for the responsibility that it had," said Harvey, noting there were only four people doing field work.

More crop research was a tough sell in the midst of a declining wheat market. But Harvey pointed out the real risk in launching the CDC was the 15 or more years that was typically required at that time to develop and launch a new variety.

The NRC approved \$455,100 over three years for research into feed barley, field peas and other new crops, and spring and winter wheat. The Province agreed to cover the \$300,000 capital cost of the new crop science field laboratory, committed \$200,000 annually for the first three years, and agreed to cover the CDC's operating budget after the NRC term grant expired. In 1972, USask announced that an additional \$100,000 had been set aside for growth room facilities to be built that summer.

Five years later, Fredrick Wesley Kernen's large gift of farmland to USask led to the creation of the Kernen Crop Research Farm, another valuable resource for CDC crop breeders. In the decades to follow, much more would be invested by governments, industry and producer groups in improved and expanded infrastructure.

The CDC was initially staffed with six scientists working on feed and food barley, peas, winter wheat, and a few other areas. But some early game-changers released in the late 1970s and through the 1980s established the CDC's reputation nationally and internationally.

Skill and timing were the common elements that catapulted not only the green Laird lentil to market dominance, but also Harrington two-row malt barley and Vimy flax. In all three cases, their spectacular success was ushered in by superior traits, combined with events such as droughts and crop failures of established varieties which created demand for the newly released CDC varieties.

CDC varieties also helped Saskatchewan become Canada's top producer of lentils, flax and peas. Other releases included the first Canadian hullless barley and new varieties of hard red spring wheat, durum, and faba beans, to name a few.

More recently, CDC researchers Bunyamin Tar'an and Donna Lindsay have helped increase the genetic diversity of chickpeas through an international project that provides plant breeders with access to thousands of seed progeny from wild plants.

The close working relationship between the CDC's malt barley breeders and the beer industry continues. Recently, head barley breeder Aaron Beattie led the "Bow Project", featuring the new variety CDC Bow barley. Malted at the Maker's Malt facility in Rosthern, 14 craft brewers in Saskatoon and Regina were then challenged to create new brews.

In the mid-2000s, the forage breeding program, which had begun in 1922 at USask and later moved to Agriculture and Agri-Food Canada's Saskatchewan Research and Development Centre, became part of the CDC. Bill Biligetu works on salt-tolerant forage grasses, important as weather extremes become more common and producers deal with high soil salinity.

Addressing crop disease has been a CDC priority. In 2020, plant pathologist Sabine Banniza was awarded more than \$1.3 million in Agricultural Development Fund for

projects looking at plant root health in pulse crops.

CDC scientists have also distinguished themselves as mentors and teachers. Randy Kutcher, who developed a quick and accurate method to quantify toxins in fusarium-infected grain, was recently honored with the 2020 North American Colleges and Teachers of Agriculture Teaching Award of Merit.

Today, crop genetic improvement remains the centrepiece of the CDC's work. A strategic research program for the period 2018-2023 lays out ambitious goals focusing on "improving the agronomic performance and the food and nutritional quality characteristics of pulse crops, cereals and flax for food, feed and industrial uses."

Linked to this is the continuing aim for diversification to enable "development of new crop kinds, specialty varieties and market classes that add value and provide the basis for value-added processing and marketing to specialty end-users." For example, Tom Warkentin, celebrated for his ground-breaking work on pea breeding and genomics, is developing new soybean varieties suitable for growing conditions across Western Canada.

Today, one thing in crop breeding remains unchanged—it still takes 10 to 12 years to develop a new variety. Pozniak embraces that challenge: peering into the future to figure out what will be next in demand is, he says, "what makes it so fun."



Curtis Pozniak, wheat breeder and director of the USask Crop Development Centre. (Photo: Christina Weese)



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