

Research priorities for irrigated crop production in Alberta



The Alberta Crop Industry Development Fund (ACIDF) is preparing to fund a significant amount of agronomic research in 2014-15. During 2014, ACIDF has been gathering the views of producers, researchers, agronomists and others on which research subjects should be tackled first.

In this discussion paper on irrigated production of high-value row crops, these industry stakeholders share their ideas on how to increase production while carefully safeguarding the water resource and managing the risks faced by farmers.

Solar power? Check. Geothermal heating and cooling? Yes. Anaerobic digester? Right this way.

For the Perry family, who farm near Chin, Alta., agriculture and technology go hand in hand. Brothers Harold and Chris Perry have a long list of innovative initiatives, either in operation or on the drawing board.

“I think it’s a passion,” says Harold Perry. “We have good guys working for us and that allows us to step back a bit and see the bigger picture. Every year we do things a bit differently.”

As Perry considers his next decade in farming, he believes technology will be even more important than today. As such, it should be the focus of agronomic research. For this operation, three research priorities stand out.

Real-time soil data. In Perry’s view, irrigation pivots have come a long way in recent years. Next, he’s looking for better information on what’s happening with his soil, right now. “I’d like to see a sensor that could measure the soil moisture and the electric conductivity of the soil,” he says, “in real time through the pivot telemetry as a decision tool for my next irrigation or fertigation application.”

Advanced soil nutrient testing and balancing. In 2014, for the first time, Perry had full-spectrum soil and tissue analysis taken. To get the most from this exercise, he used three different labs for the analysis. “Looking at both the main nutrients and the micro-nutrients, I can see that I’m deficient in a few areas,” he says. “I’ll be tweaking the nutrients for next year in order to optimize my crops. For next year I am trying to figure out, from the full-spectrum tissue and soil analysis, what nutrient I need to apply at what crop stage in the different soil types on my farm to optimize plant health and yield.”

As another potential research priority, Perry would like to know more about the optimum ratios for different nutrients, when growing crops under irrigation. He notes it’s not always the amount of each nutrient that matters, but their proportion. “The way the soil works, if a certain nutrient is too abundant, it can tie up other nutrients in the soil that look sufficient in pounds per acre on your soil test,” says Perry. “But these nutrients are unavailable because the abundant nutrient is tying them up, making them unavailable to the plant.”

Disease management under irrigation. Perry is highly conscious of needing a diverse toolkit for managing crop diseases. They put down compost for crop nutrition and also for its value for disease suppression. While the operation is big in potatoes, another key crop is peas, which they grow for Lucerne. “We grew some peas on virgin land this year, but at other times, root rot is a serious disease concern. It can hammer your yields by 50% pretty easy.”

With answers to these questions, and others, Harold Perry believes southern Alberta farmers can continue to innovate their way to bigger and better crops, and less environmental impact.

Look up (the sky) and down (crop rotations)

Roy Brewin may farm more irrigated acres than anyone in Canada, possibly in North America. With 20 different crop varieties grown for grain and seed, organically, the complexity of this Taber-area operation is daunting to consider. For this irrigated crop producer, however, one issue looms above the others: the risk that all his work could be destroyed by a single hailstorm.

“It’s an issue under dryland, for sure, but we have so much money invested on a per-acre basis with irrigation,” says Brewin. “Hailstorms can totally wipe a field out, it’s a huge uncertainty, and we could do something to relieve that risk. I don’t understand why we’re not doing more on the issue of cloud-seeding.”

The management of insects and diseases is an important issue on any farm, and Brewin believes that better crop rotations would help matters. He’d like to see more research on optimum rotations of different crops under irrigation. If we did that, he figures, pest management could become a less challenging issue.

“I think that a lot of pest and disease issues are caused by poor rotations,” says Brewin, “Some of us have gotten too greedy with rotations, so a lot of it is self-inflicted. We could do more work on this.”

Answers needed in corn and soybean agronomy

In recent years, Alberta farmers have been increasing production of grain corn, as well as soybeans. Despite this growth, the fact remains that this isn’t Iowa, Illinois or Ontario, areas with an ideal climate and decades of experience with these row crops.

Doon Pauly, Lethbridge-based Agronomy Research Scientist with Alberta Agriculture and Rural Development, has viewed this growth with interest as well as professional concern.

He wonders whether Alberta growers have all the tools and information they need to grow these up-and-coming crops profitably and with reasonable risk. As such, he advocates increased research in corn and soybean agronomy.

Corn. “The whole area of getting corn ready for harvest, in terms of crop maturity and drydown, needs to be examined,” says Pauly. “We might not have things worked out well enough. What do you do with the crop when the unexpected happens? What do you do if you get frost on September 10th?”

He cites the example of a farmer he know and works with, who grows grain corn near Bow Island. If any area in Alberta can grow grain corn successfully, it’s the Bow Island area. Yet, this grower is accustomed to drying down his corn after harvest. Pauly asks, if you have to dry corn in Bow Island, what does that mean for the rest of Alberta?

“If we’re trying to develop this crop, I’d like to see what we can do about this,” says Pauly. “Perhaps you can manipulate the system, either before planting or later, to get the crop maturing sooner.”

Soybeans. Pauly is even less convinced that soybeans, as they’re currently grown, represent an acceptable risk-reward trade-off for Alberta growers. “I’m more bullish on corn than

soybeans, because with corn, we can get the genetics we need into a system we can use, faster than with soybeans.”

As Pauly measures the problem, he suspects that the key to getting a worthwhile crop is to get it planted earlier. A desirable planting range might be the second half of May. Cold soils may be an impediment to this approach, leading Pauly to ask whether tillage or some other method to warm the soil might be beneficial. This issue demands solid research, in his view.

“It is a fairly long-season crop, so I think we need to figure out how to get soybeans going earlier,” he says. “If we could push it maybe seven to 10 days earlier, that would give soybeans a better chance of success here.”

Meeting the promise of new technology

What do irrigated crop producers in southern Alberta want? Agronomist, technology consultant and self-described ‘water guy’ Jeff Bronsch brings a seasoned viewpoint to this question.

“They just want to be really good at what they do,” says Bronsch, owner of Sunrise AG, a potato production support company based in Taber. “One issue is time. As farms get bigger, the grower can’t be everywhere at once. You want to go out and check your fields, but if you’re farming 40 quarter-sections of land, where do you start?”

As Bronsch sees it, technology offers the promise of helping the grower focus on what matters most *right now*, and make the best possible use of the water resource. He proposes greater research attention to the following areas.

Irrigation scheduling. How much water does each different crop and variety need, at every stage of its growth? Bronsch sees the need for research in this area, to allow growers to achieve the right balance between crop productivity and water use efficiency.

Soil moisture monitoring. “There are many tools coming in terms of in-field soil moisture sensors,” says Bronsch. “The opportunity is to use these to schedule irrigation. If growers could go to an app, push a button and see where they’re wet and where they’re dry, that would be important.”

In-crop fertigation. Though commonly *practised*, fertigation – that is, fertilizer applied to the crop through irrigation pivots – isn’t widely *understood*. Bronsch sees basic information lacking, in areas such as timing and response in different crops. “In potatoes, what timing is right to put it on?” asks Bronsch. “For busy growers, there can be a seven- to 14-day lag between seeing the need and getting it on. So how do you determine *when* and *how much*?”

Adaptation of existing knowledge to Alberta. At times, Bronsch is frustrated when he reads about crop research taking place in Alberta. He may know that similar work is being done, or has been done, in another jurisdiction. Rather than pay for brand-new research, it may be quicker and cheaper to buy it there and try it here.

“I really think, from a research point of view, the world is getting smaller,” says Bronsch. “About 95% of ag research that would apply to Alberta is being done outside Alberta. We need new ways to access this information. If we could freely share what we all know about growing food, that would be a big step forward.”

And finally, help to make sense of it all. If producers took all the time they needed to learn about new farming technology as it develops, there’d be no time to grow the crops. If

three companies are developing pivot systems, for example, how does the grower know which is right for them? Without a doubt, professionals like Bronsch will continue to play a curating role with evolving technology. Beyond this, he thinks agronomic research should encompass reaching out to growers with new information.

“The whole movement of data, and data management, is new,” says Bronsch. “Some producers are embracing it and others are scared of it. The challenge I see for producers is to be exposed to these ideas and get over their fear.”