



Herman Simons,
Project Manager -
Smart Agriculture
Applied Research, Olds
College of Agriculture &
Technology, presenting
on economic modeling
at AgSmart 2022.



Moving Ag Tech Forward

Digging into the ROI of Variable Rate Technology with TELUS Agriculture

Across the 3,600-acre Smart Farm, Olds College Centre for Innovation (OCCI) is evaluating variable rate technology (VRT) for fertilizer application, which could help producers save money, increase yields and improve their environmental footprint.

Herman Simons, Manager of Smart Ag Applied Research at Olds College of Agriculture & Technology, is leading ongoing research to better understand the return on investment (ROI) of VRT as part of a five-year strategic partnership with TELUS Agriculture. The partnership aims to test and develop ag tech to enable greater innovation and better decision making, yields, efficiency and sustainability in food production.

VRT is part of a precision agriculture approach that enables producers to get more exact in what and how much they apply to their crops. With VRT, a field can be defined into respective zones where different or variable rates of applications are used. Producers no longer need to apply a flat rate to an entire field with fertilizer, water, seed or inputs — they can now make more informed and targeted decisions backed by artificial intelligence, Internet of Things (IoT), predictive analytics and data from field maps, sensors, soil sampling and historical crop performance. This can ultimately help producers cut costs and improve the use of inputs and natural resources, while increasing productivity, profitability and sustainability.

“We’re trying to help producers more easily quantify the value of VRT on their farm by expressing it in monetary value,” explains Simons. “This economic model will help determine what level of field variability is required to make investing in VRT worthwhile. For example, if producers can reduce 10 per cent of fertilizer usage on a third of their acres without negatively impacting their yield, would it be worth investing in VRT? The range of variability in each field impacts the financial return for VRT. The extent of the field’s variability and the impact it has on ROI has led to a disconnect between the technology that’s already included on farming equipment and the adoption of VRT.”

Validating the Economic Return for VRT Fertilizer: Preliminary Results

The research ran a break-even analysis based on a 10-year time period where VRT fertilizer rates were used on an individual 2,000-acre farm with a four-year crop rotation of canola, wheat, barley and peas. Different scenarios were explored that focused on optimizing fertilizer use, increasing yield and the impact of reduced greenhouse gas emissions related to change in fertilizer use.

Early results indicate that VRT as included in part of normal farming operations can help producers reduce their environmental footprint while staying productive — especially if producers can capitalize on carbon credit programs that the practice itself would qualify them for.

The results also show that prioritizing yield increase from reallocating fertilizer can drive the biggest economic return, rather than focusing on savings from fertilizer reduction only (based on early 2022 fertilizer prices as compared to 2021).

Proving the economic viability of VRT for fertilizer application was an important project to explore for both TELUS Agriculture and Olds College. Fertilizer makes up a significant portion of a farmer’s operating costs, and prices have shot up in the last year due to supply chain issues and global conflicts.

“Precision agriculture technologies like VRT can, when implemented with preferred management practices, bring a range of benefits from a sustainability perspective including better environmental outcomes – GHG emission reduction and mitigation of risks to local air and water quality – whilst strengthening farmer livelihoods,” adds Kevin Ramm, Head of Sustainability at TELUS Agriculture.

“There are significant economic opportunities for producers, depending on their geography and supply chains, to take part in programs that will reward more sustainable and regenerative farm management practices such as improved nitrogen management. It’s a potential win-win for producers and the planet.”

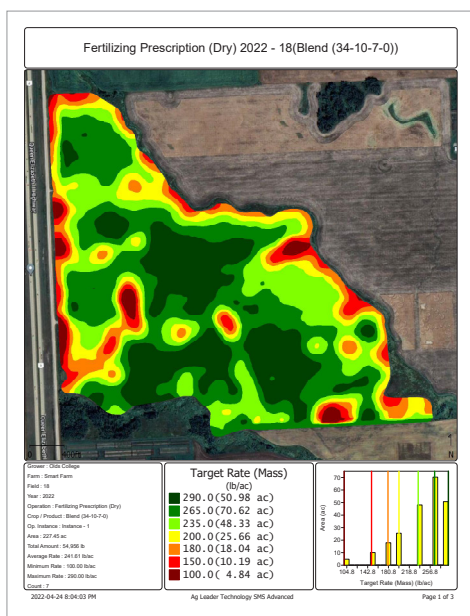
Future Research with TELUS Agriculture

Simons and his team continue to research VRT’s economic potential to help bridge the adoption gap on farms as part of the TELUS partnership, as well as how it could help optimize fertilizer use to improve environmental sustainability on farms. Further analysis is planned to enhance the level of detail on field variability to make it more farm and field specific, validate the results across

different crop types and other VRT such as seeding and crop protection applications, and consider the overall investment required to implement VRT on farms.

Smart farms, technology development and precision ag have a critical role to play in the ‘global grand challenge’ of feeding a growing population with fewer resources in an increasingly environmentally-aware society. Agriculture is a risky business — technologies and data help crop and livestock producers manage risk.

An updated research report and findings about economic modeling will be released in early 2023. Stay up-to-date with research findings and results at oldscollege.ca/smartfarm.



Prescription map for Steckler Farm, part of the Olds College Smart Farm, which helps the research team build the economic model for VRT.