

UNDERSTANDING THE TRADE-OFFS OF CROP ROTATIONS

This two-year study aims to create a decision-making tool showing the impact of planned crop rotations on disease pressure, yields and economic returns.



Dr. Elwin Smith, Economist and Adjunct Professor at University of Lethbridge.

Crop rotations are one area where theory and practice tend to collide. High-minded theory calls for four or five crops in rotation and avoiding planting the same crop in succession. Practical reality suggests there are bills to be paid and crops that provide a higher return this year are more likely to be chosen.

Still, it's a calculation that might be less straightforward than it first appears. That's because shorter rotations tend to favour disease development, leading to potentially lower yields and higher input costs in the future. Dr. Elwin Smith considers canola a prime example.

"If canola has generated the best margin for growers, that

will encourage shorter rotations and more canola," said Smith, an Adjunct Professor in the Department of Economics at the University of Lethbridge. "But there can be foreseeable unintended consequences: higher returns today, but possibly lower yields in the future, due to the buildup of diseases like blackleg and clubroot. Root diseases and *Aphanomyces* in peas is another example."

What if producers could evaluate the impact of rotational decisions before they plant today and years into the future? That's exactly what Smith and fellow University of Lethbridge Economist Dr. Danny Le Roy have in mind.

In 2019, they started a two-year project – funded by the Canadian

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Agricultural Partnership's Integrated Crop Agronomy Cluster – to nail down the economic value of more diverse crop rotations.

There's an app planned for that

In the first phase of this project, Le Roy and Smith will gather existing data on this question and seek the input of plant pathologists and agronomists.

"In one crop insurance study put together by AFSC, it was found that when peas were grown two years running in the same field, yield dropped by 15% on average in the second year," Le Roy said. "Peas followed by spring wheat would have produced a better economic result. That's the kind of insight we're after."

In some areas, such as the Parkland region, canola can be over-represented in crop rotations. Some Manitoba farmers are stuck in a corn/soybeans/canola rut. Le Roy and Smith have a network of colleagues in place to provide input specific to these and other regions.

"By the end of the project, we hope to develop an app – something simple that can highlight the impact of a given rotation over time and evaluate alternatives," Le Roy said. "The idea would be similar to a 'mortgage wizard' you can use to quickly sort through your mortgage options."

Everyone knows a diverse crop rotation is good for the soil, helps manage disease pressure and supports the long-term sustainability of the operation. In real life, however, economic returns vary significantly between crops and everyone has bills to pay. Le Roy and Smith suspect their work might ultimately show that current profitability and long-term sustainability are on the same team.

"A lot of producers know this inherently," Smith said. "Our contribution is to quantify whether gains expected from a more diverse crop rotation actually happen."