



Evolution of Sustainable Agriculture in Saskatchewan

Stuart Smyth, PhD
Professor
University of Saskatchewan
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Thank you to my stakeholders



**SASK
OILSEEDS**



GIFS | GLOBAL INSTITUTE
FOR FOOD SECURITY

POTASHCORP - A FOUNDING PARTNER



**Alberta
Grains**



SaskBarley
DEVELOPMENT COMMISSION

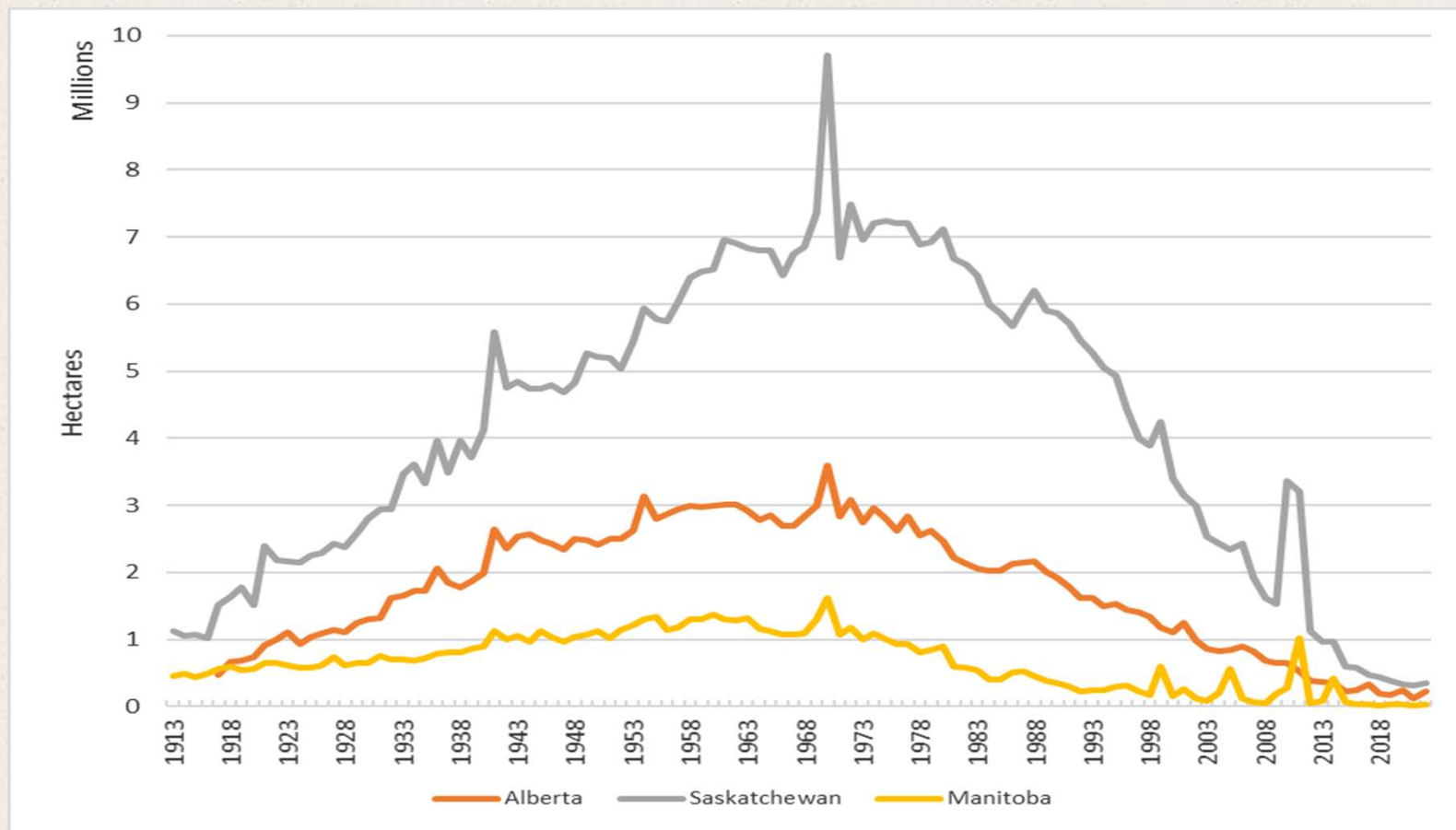


syngenta®



Bayer CropScience

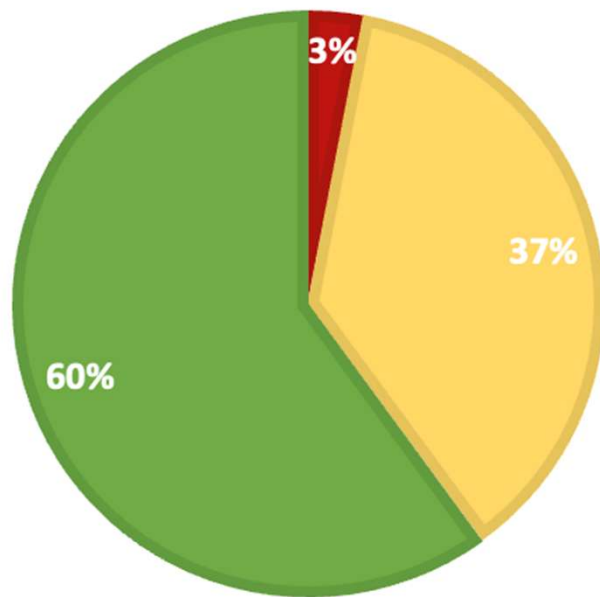
Prairie summerfallow hectares, 1913-2022



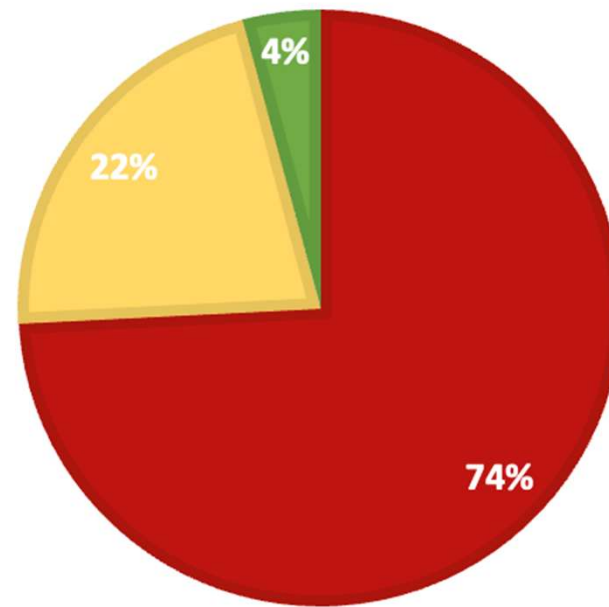
Source: Statistics Canada. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901>

Tillage use: Sask vs EU

SASKATCHEWAN TILLAGE PRACTICES 2016-19



EU TILLAGE PRACTICES - 2016

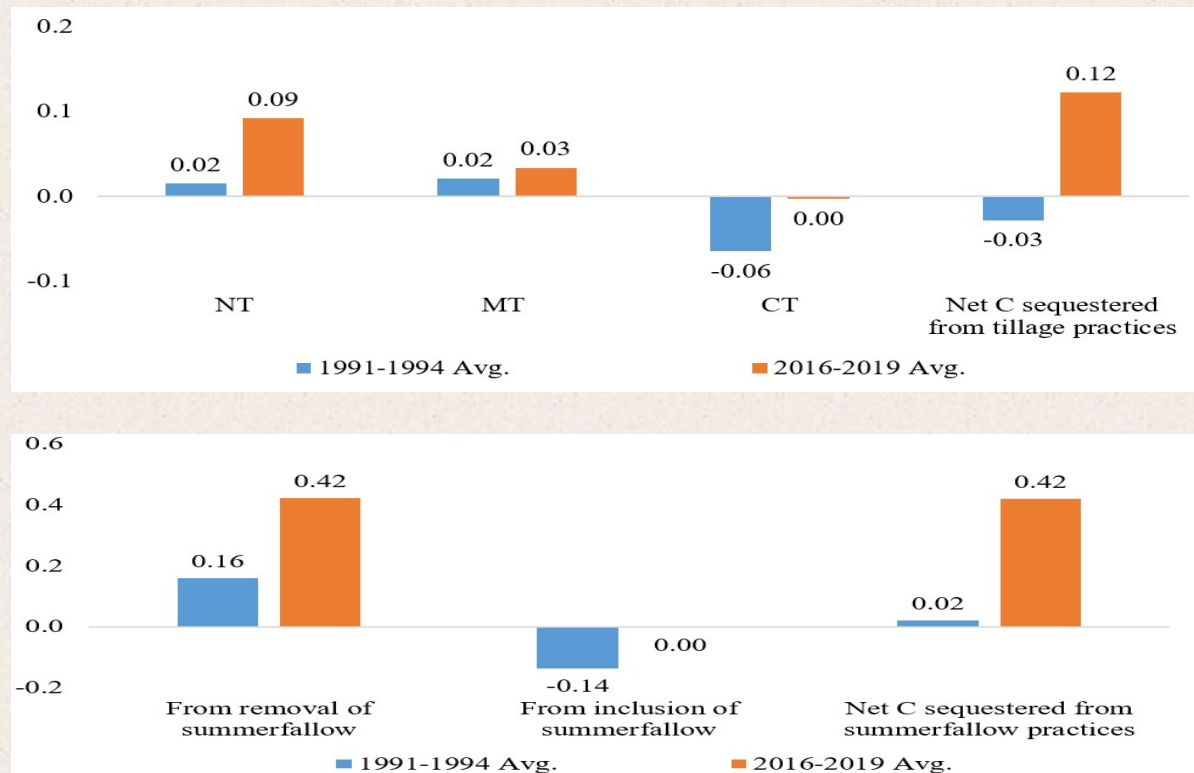


■ Conventional Tillage Ha ■ Minimum Tillage Ha ■ No-tillage Ha

SK Source: Sutherland et al. 2021. <https://www.mdpi.com/2071-1050/13/21/11679>

EU Source: Eurostat, 2020. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Figure1_Share_of_tillage_practices_in_the_EU27_2016.png

Carbon sequestration



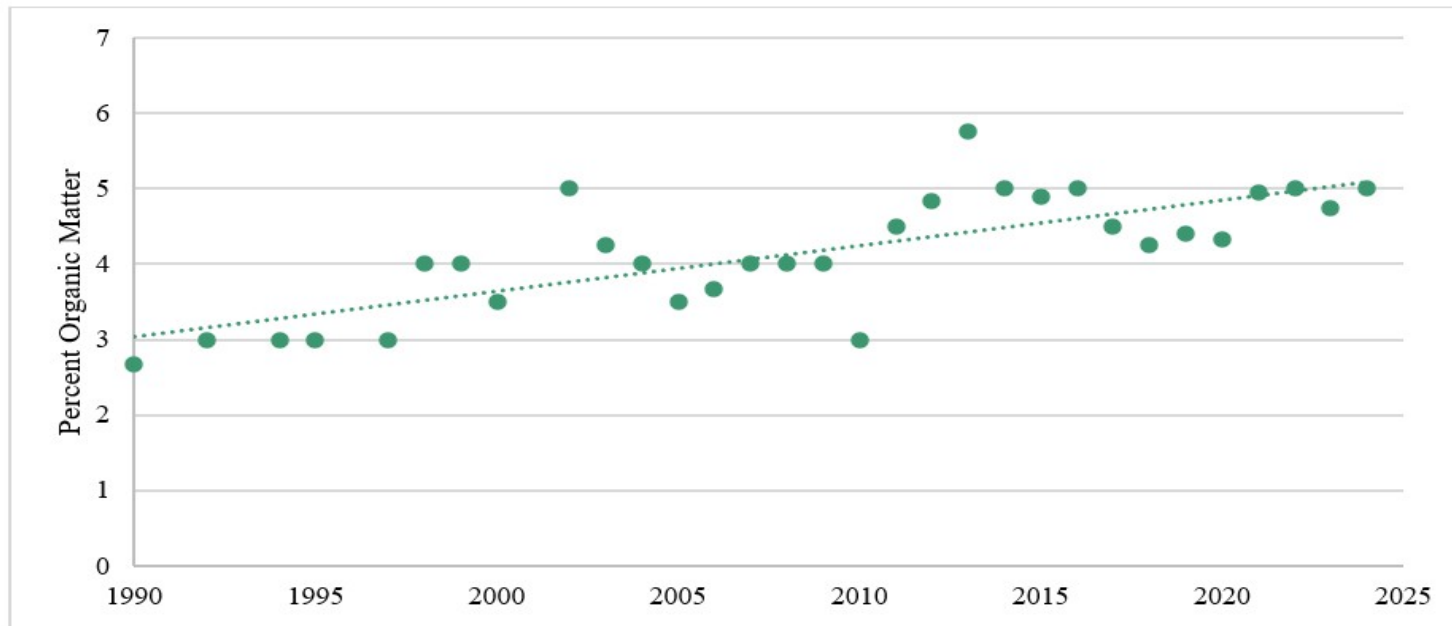
- A 1991-4 1000 ha farm emissions equal to those of 42 cars in 1 year
- 2016-9 sequestered emissions equal to 432 cars

Source: Sutherland et al. 2021. <https://doi.org/10.3390/su132111679>



Soil health

Figure 3: Change in percent soil organic matter in Saskatchewan soils, 1990-2024



- SOM has increased 41% over this period
- Historic SOM levels 12-14%

Source: Sutherland et al. 2026. <https://doi.org/10.1016/j.envc.2026.101613>

Moisture conservation

- GM canola first grown in 1997
- In 2006, 83% of farmers said soil moisture levels increased
- 86% indicated that soil erosion was reduced
- 25 years of zero and minimum tillage have created a layer of post harvest residues that act as an insulator in extreme heat periods
- A 3 year study of pesticides residues in wetlands in Alberta involving 35 different sites found residue levels well below regulation standards in all but 3 samples



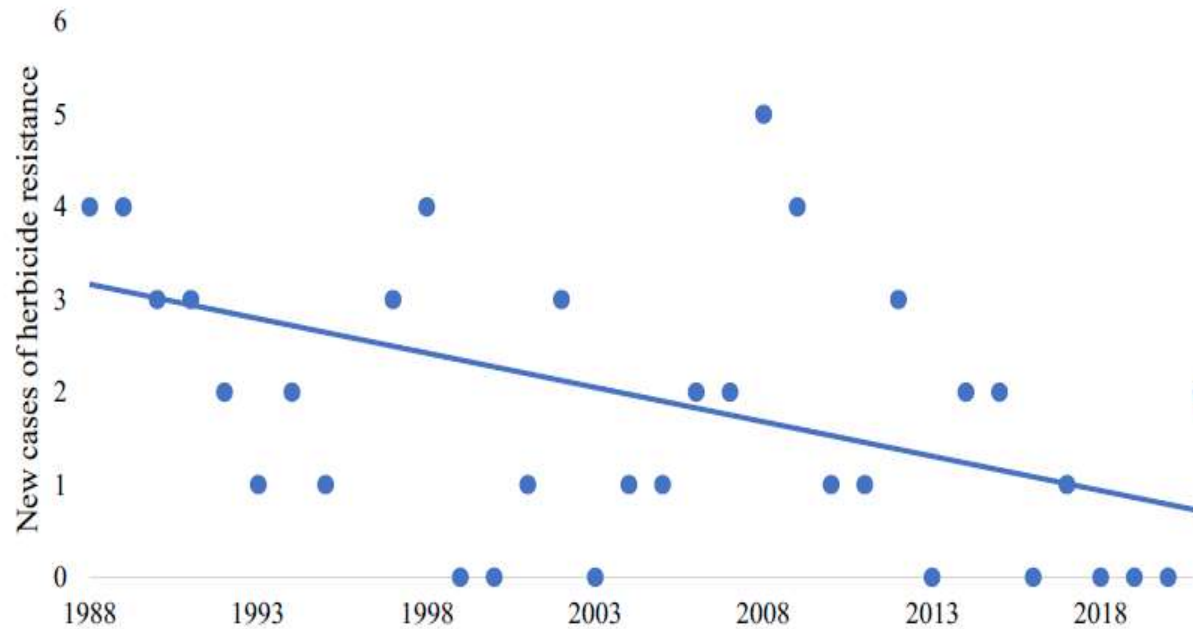
Biodiversity

- Between 1991-94 and 2016-19, the environmental impact of in-crop herbicides dropped by 65% (Lika et al.)
- Farmers sprayed 45% less active ingredient
- New research comparing all pesticide use between 2004-06 and 2020-24 found a 14% increase in environmental impact
- Herbicide impact up 16%
- Fungicide impact down 10%
- Insecticide impact down 69%
- Anecdotal reports of increased earthworm populations
- Greater wildlife in crops than summerfallow

Source: Lika et al. 2024. <https://doi.org/10.1017/wet.2024.15>
Sammons et al. Paper presently under review.



Changes in the use of tillage in Sask



$P\text{-value}=0.015, R^2=0.17.$

Figure 2. Number of reports of new HR weed incidences on the Prairies per year, 1988–2021. $P\text{-value} = .015, R^2 = 0.17.$

Systems approach

- Sustainable production has improved due to the integration of:
 - genetically modified crops
 - variable rate seed, fertilizer and pesticide application
 - improved crop genetics
 - herbicides with multiple modes of action
- Policies targeting just one of these factors will create adverse effects for farmers and downstream for food processors
- Precaution-based pesticide bans, when no viable alternative is available reduces yield, profitability and sustainability



Thank you,
Professor Stuart Smyth
akml@usask.ca