Crop Rotations in NW Saskatchewan

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North Battleford Office
Why Does Crop Rotation Matter?

- Disease issues
  - Increased inoculum waiting for right weather conditions
- Weed issues
  - Herbicide resistant weeds
- Yield impacts
  - Lower yields due to pest issues
- Crop quality
  - Downgrading due to pest issues (insect damage, weed seeds, mycotoxins etc.)
- Variety genetics
  - Overuse of varieties with genetic traits
- Utilization of soil moisture and nutrients
  - Accessing all parts of soil profile, moderating salinity issues
Looking Closer at the NW Region

What do our crop rotations look like in the NW?

- Used SCIC data to evaluate seeded acres (insured and uninsured acres)
- Took 7 years of data
- Used CSO districts of North Battleford and Turtleford
Disease and Crop Rotation

Diseases causing a lot of yield loss and crop quality concerns

- **Canola** –
  - Blackleg - 1 in 3 years canola (2 year break)
  - Clubroot – 1 in 3 years canola (2 year break)
  - Sclerotinia – 1 year break to decrease inoculum

- **Wheat** – FHB
- **Barley** – FHB
- **Oats** – FHB

Min 1 year break ... but 2 years better (residue needs to break down)

- **Peas and Lentils** – Root root complex
  - Fusarium spp.
  - Rhizoctonia
  - Pythium
  - Aphanomyces
  - Sclerotinia

Min of 6 year break... but up to 8 years
How Often Are We Growing These Crops?

- Look SCIC data by crop district
  - Only crop district 9B

- Data years
  - 2008 to 2018

- Fields History
  - 9 out 11 years of field history with SCIC

- Field size
  - Minimum of 130 acres
  - Approx. 4500 fields in crop district 9B

- Crops included
  - Canola, wheat, barley, oats, flax, lentil, peas
Frequency of Canola Grown 2008 -18 (9B)

In approximately half of fields canola was grown the most 4 or 5 times over the 11 years.

Number of Times Occurs in Field

- 1: 310
- 2: 455
- 3: 803
- 4: 1179
- 5: 1149
- 6: 500
- 7: 88
- 8: 16
- 9: 4
- 10: 0
- 11: 0

n = 4595
Frequency of Wheat Grown 2008 - 18 (9B)

Wheat was grown most frequently 4 times the on the field over 11 year period
Every 2 to 3 years

Wheat 2008 - 2018 (9B)
\( n = 4595 \)
Frequency of Wheat and Canola Grown 2008 - 18 (9B)

Approximately one quarter of fields had wheat and/or canola grown 8 or 9 times out of 11 years.

Over half of fields grew wheat and/or canola 6 or more times in 11 years.

Wheat or Canola 2008 - 2018 (9B)

n = 4595
Three quarters of the fields had a cereal (wheat, barley, oats) and/or canola grown on them 8 or more times in 11 years.

Wheat Barley Oats Canola 2008 - 2018 (9B)

n = 4595
One third of fields had peas grown once in 11 years

Peas were only grown in 19 fields more than 3 times in 11 years

### Chart

<table>
<thead>
<tr>
<th>Number of Times Occurs in Field</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peas 2008 - 2018 (9B)</td>
<td>1338</td>
<td>690</td>
<td>282</td>
<td>18</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**n = 4595**
When looking at pulse grown of either pea or lentil or both grown does not change much from previous graph.

Number of Times Occurs in Field:
- 1: 1330
- 2: 714
- 3: 308
- 4: 27
- 5: 1
- 6: 0
- 7: 0

n = 4595
Frequency of Canola, Wheat or Peas Grown 2008 - 2018 (9B)

Canola, Wheat, Peas 2008 - 2018 (SCIC)

n = 4595

One quarter of fields grew only wheat, canola and/or peas on field over 11 years

Number of Fields by Number of Times Occurs in Field

<table>
<thead>
<tr>
<th>Number of Times</th>
<th>Number of Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>158</td>
</tr>
<tr>
<td>2</td>
<td>151</td>
</tr>
<tr>
<td>3</td>
<td>163</td>
</tr>
<tr>
<td>4</td>
<td>188</td>
</tr>
<tr>
<td>5</td>
<td>257</td>
</tr>
<tr>
<td>6</td>
<td>289</td>
</tr>
<tr>
<td>7</td>
<td>370</td>
</tr>
<tr>
<td>8</td>
<td>448</td>
</tr>
<tr>
<td>9</td>
<td>594</td>
</tr>
<tr>
<td>10</td>
<td>792</td>
</tr>
<tr>
<td>11</td>
<td>1178</td>
</tr>
</tbody>
</table>

One quarter of fields grew only wheat, canola and/or peas on field over 11 years.
Calculated Yields – Canola (SCIC)

- Canola on canola stubble average to slightly lower yields
- Canola on lentil stubble best
- Canola on pea increased yield
- Canola on flax stubble has increased yield potential
Calculated Yields – Field Pea

- Pea on pea stubble lower yield
- Canola on wheat stubble or barley stubble best yields
- Pea on canola or oat stubble was lower
Calculated Yields – Oat (SCIC)

- Oat on oat stubble lower yields
- Oat on pea or canola stubble increased yield
- Oats on wheat stubble gave around average yields
What Other Cropping Opportunity Possible in NW?

Additional crops grown in NW (acres)

- Fababeans
- Soybeans
- WW
- Hemp
- Durum
- Fall rye
- Mustard
- Camelina
- Grain Corn

**Economics of Other Cropping Options**

**New Crop Planning Guides**

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**2020 Canola**

**Economics**

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<thead>
<tr>
<th></th>
<th>My Farm</th>
<th>Brown</th>
<th>Dark Brown</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue Per Acre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target Yield (bu/ac)</td>
<td>48.50</td>
<td>50.90</td>
<td>53.60</td>
<td></td>
</tr>
<tr>
<td>Estimated Farm Gate Price (bu/bu)</td>
<td>10.70</td>
<td>10.70</td>
<td>10.70</td>
<td></td>
</tr>
<tr>
<td>Estimated Gross Revenue (bu/bu)</td>
<td>518.95</td>
<td>532.81</td>
<td>573.66</td>
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**Expenses Per Acre**

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<tr>
<td>Seed</td>
<td>6.19</td>
<td>6.73</td>
<td>8.14</td>
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<tr>
<td>Plant Protection - Herbicides</td>
<td>19.15</td>
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<td>Fertilizer</td>
<td>3.82</td>
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<td>Custom Work and Labour</td>
<td>20.80</td>
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<td>Crop Insurance Premium</td>
<td>101.2</td>
<td>90.7</td>
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<td>3.12</td>
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<td>Interest on Variable Expenses</td>
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<td>Total Variable Expenses</td>
<td>286.04</td>
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<td>344.81</td>
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**Yield Sensitivity (same expenses, but average yield)**

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**Agronomics**

Notes: *See the following calculations at saskatchewan.ca/LocalBooks for the "My Farm" column. Calculators provided under the top 20 per cent yield.

Seeding: A seeding rate of 75 lb/ac is used for each of all zones.

Fertilization: Fertilizer rates are based on the 20-year average data from the three target crop yield zones (1.44 bushels per acre, 1.41 bushels per acre, and 1.38 bushels per acre). The fertilizer rates add 50 lb/ac as the first 50 lb/ac, 50 lb/ac as the second 50 lb/ac, and 10 lb/ac for the dark brown soil zone and 20 lb/ac for the brown soil zone. Farmers are encouraged to use their own rates, based on their soil test results.

Crop Rotation: Crop rotation will help to reduce root maggot and prevent disease from diseases, such as blights, by reducing or maintaining low population levels in the field.

Crop Protection: Chemicals used for control of weeds, corn rootworm, Colorado potato beetles, and black seed in the field.

Disease control: this information is for disease management with the application of foliar fungicides. The information includes the use of one Rival fungicide application in the dark brown and black soils. Disease pressure will vary from year to year and from field to field. For this reason, this information is an estimate and should be used as a general guide. Fungicide application decisions should be made based on disease risk and not the crop is susceptible to infection.

Fertilizer Use: The table provides the amount of fertilizer to be applied in the field.

Soil Testing: This table provides the amount of soil testing to be applied in the field.

Nitrogen Use: The table provides the amount of nitrogen to be applied in the field.

Application Timing Windows:

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*Managers manage to determine that these actual labour and management costs associated to total expenses.
Flax and Fababeans

Black soil zone net returns on variable expenses

- Canola $223.86
- Flax $236.50
- Yellow Peas $149.21
- Fababeans $152.26
Rye, Oats and Canaryseed

Black soil zone net returns on variable expenses

- Wheat $176.44
- Fall Rye $122.33
- Oats $213.83
- Fababeans $268.28
Take Home Messages

• Most common rotation is wheat and canola in NW as predicted
• Half of the 4500 fields had canola grown 4 or 5 times out of 11 years (almost half the time)
• Wheat was grown most commonly every 2 to 3 years
• Over three quarters of fields had a canola and wheat grown on field 8 to 11 times over 11 year period
• One quarter of the fields out of approx. 4500 had wheat, pea and canola grown only on that field
Take Home Messages (cont.)

• Not a lot of diversity in fields and many diseases are present in one or more of these crops
  – (i.e. sclerotinia and fusarium spp.)
• Other crops can be grown in NW
• Wider rotation can increase yields – different stubble types
• Economics for other crops are just as good as canola and wheat
Questions?

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