

# Using Satellite Imagery to Generate In-Crop Pesticide Prescription Maps

## Smart Ag Research

### RESEARCH QUESTIONS:

**Are VR prescriptions built using satellite imagery representative of field variability? Define additional requirements and benefits as a result of VRT implementation.**

#### Method

- Develop maps using available satellite imagery in 2020 & 2021
- Include checkstrips within each application
- Complete assessments to compare VR against a full flat rate application
  - Disease pressure
  - Normalized Difference Vegetation Index (NDVI)
  - Harvested yield comparisons
- Complete a simple cost benefit analysis of flat rate to variable rate pesticide applications



#### Results

- Assistance provided by subject matter experts was considered invaluable (mapping, agronomists, data cleaning)
- Use caution when applying rate smoothing tools
- Be aware of imagery available:
  - Date captured
  - Crop staging (canopy cover, canola flowering)
  - If cloud removal software was used
- Anticipate variances in required chemical based on equipment abilities & level of map detail
- Level of benefits achieved by VR are impacted by:
  - Overall variability of the field
  - Level of rate smoothing applied
  - Capabilities of equipments rate controllers & sectional control
  - Cost of the prescribed product for the VR application
  - Allowable pesticide label application rate
  - Number of target rates within the map

#### Producer Value

- Use of in-season satellite imagery enables producers to build (or have built) variable rate pesticide prescriptions that are representative of current field conditions without the need for additional UAV equipment or significant ground truthing.

#### Decreased Chemical Usage

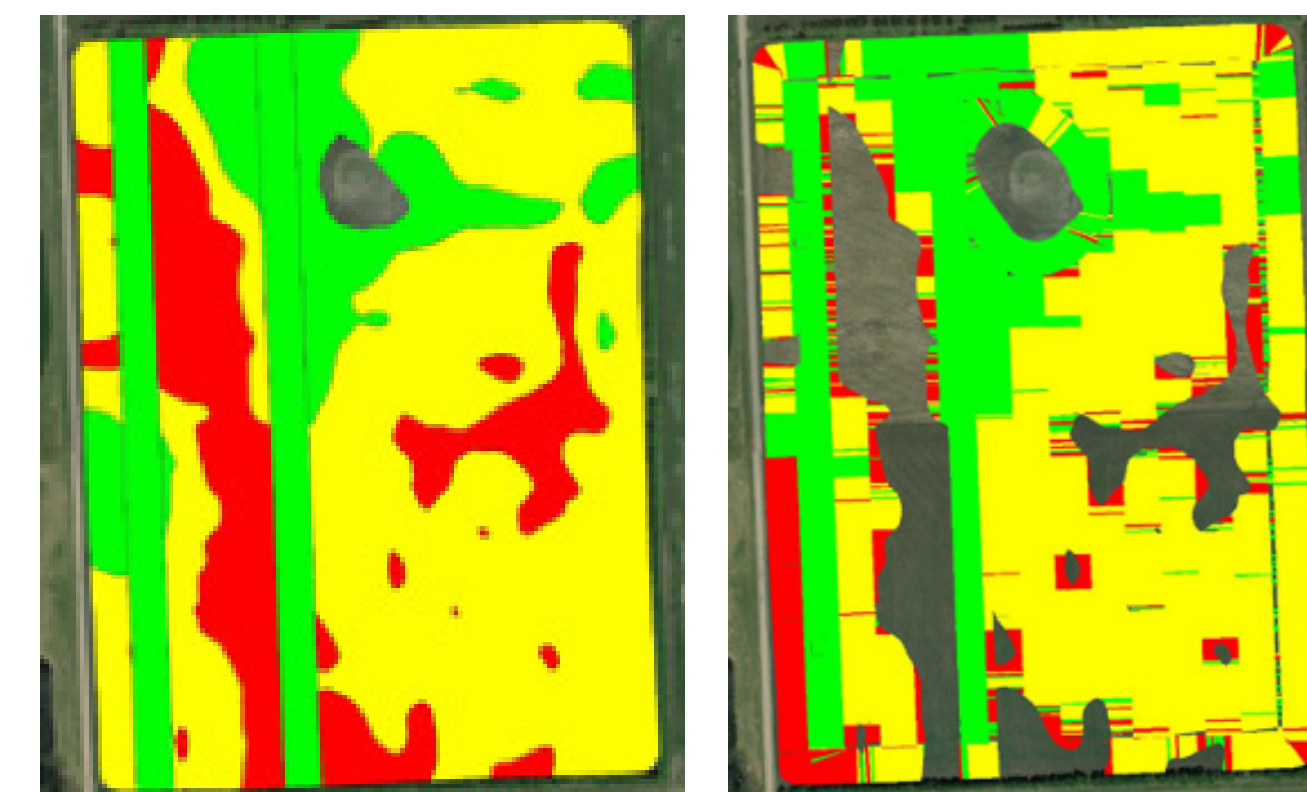
Fungicide	Prescribed	Full Rate
Product (Liters)	19.2	28.5
Water (US Gal)	480	711.7

Desiccant	Prescribed	Full Rate
Product (Liters)	57.9	86.7
Water (US Gal)	1715	2570.5

#### Rx & As Applied Map of 2021 Desiccant Application in Field 15/16

Target Rate (Liquid) (gal/US/ac)  
 24.50 (26.77 ac)  
 18.00 (58.89 ac)  
 0.00 (19.26 ac)

Rate (Volume) (gal/US/ac)  
 19.00 - 30.00 (25.56 ac)  
 17.00 - 19.00 (48.96 ac)  
 0.00 - 17.00 ( 8.44 ac)



#### Difference in Costs of Application

Fungicide Application	Cost/Acre
Prescribed VR	\$19.49
Flat Rate (High)	\$28.58
VR Only (full field, no check strips)	\$15.36

Desiccant Application	Cost/Acre
Prescribed VR	\$9.87
Flat Rate (High)	\$14.79
VR Only (full field, no check strips)	\$9.07

#### Desiccant Rate & Acres Comparison: Prescribed vs Actual

Zone Application Rate	Applied Rate (mL/acre)	Prescribed Acres	Actual Acres
High Application Rate Zone	826.4	26.8	25.6
Low Application Rate Zone	607.2	58.9	57.4
No Application Zone	0	19.3	22.0
Total Acres		104.9	104.9