Using Weather and Other Data in Making Production Decisions

Dan Heaney & Andy Nadler

Agronomy Update 2017
January 17,18
Lethbridge, Alberta

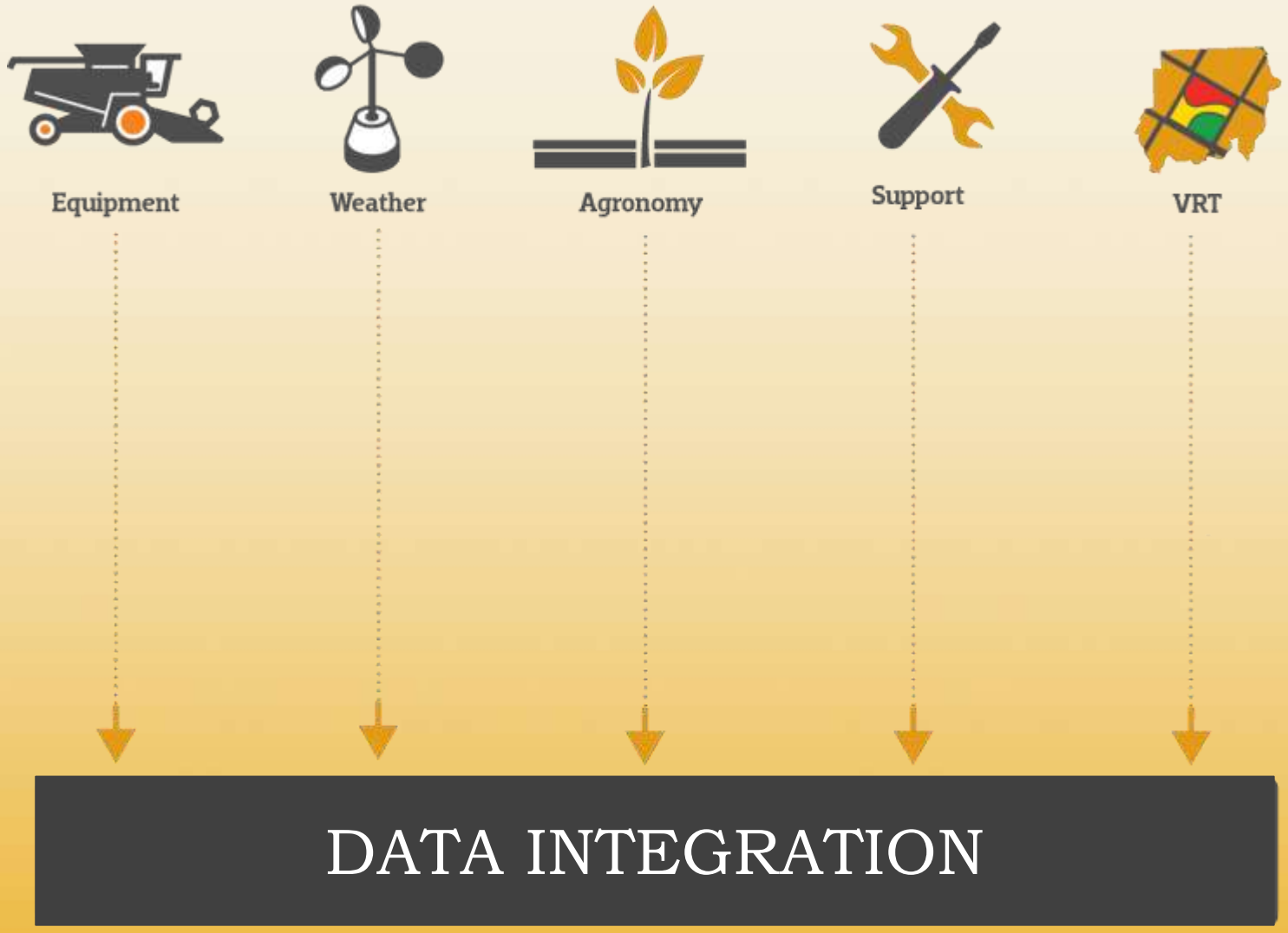
VISION

THE PRECISION AGRICULTURE PLATFORM

- The Right Data
- Decisions with Impact
- Ease of Use
- Scalable Solution

INTEGRATED: AGRONOMY, HARDWARE, SOFTWARE

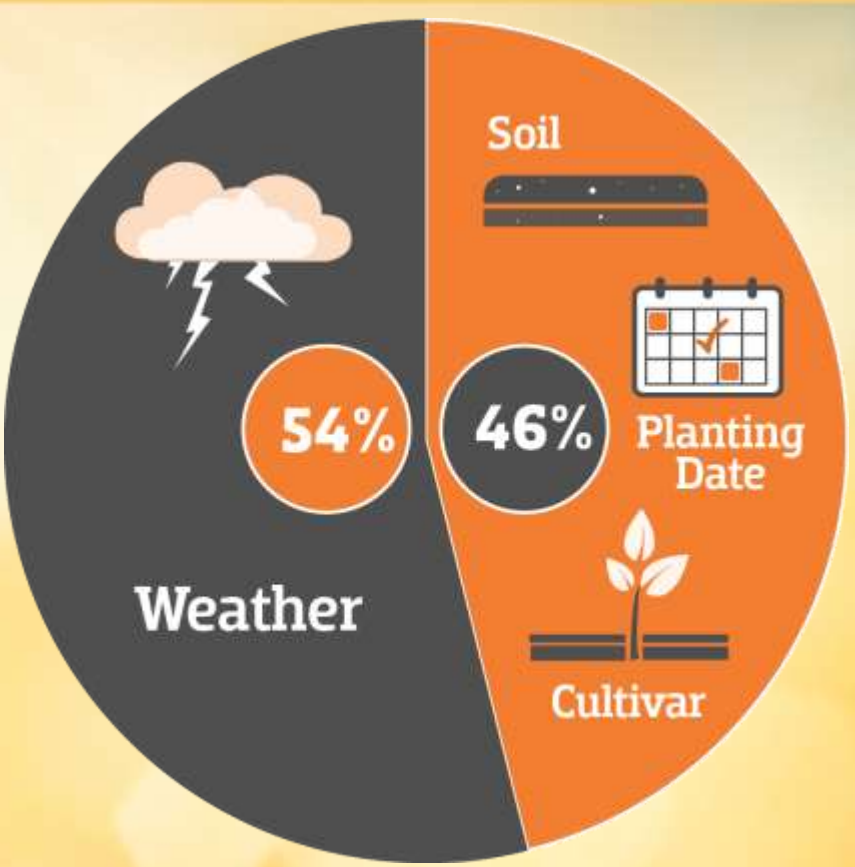
SYSTEM INTEGRATION CREATES **VALUE**



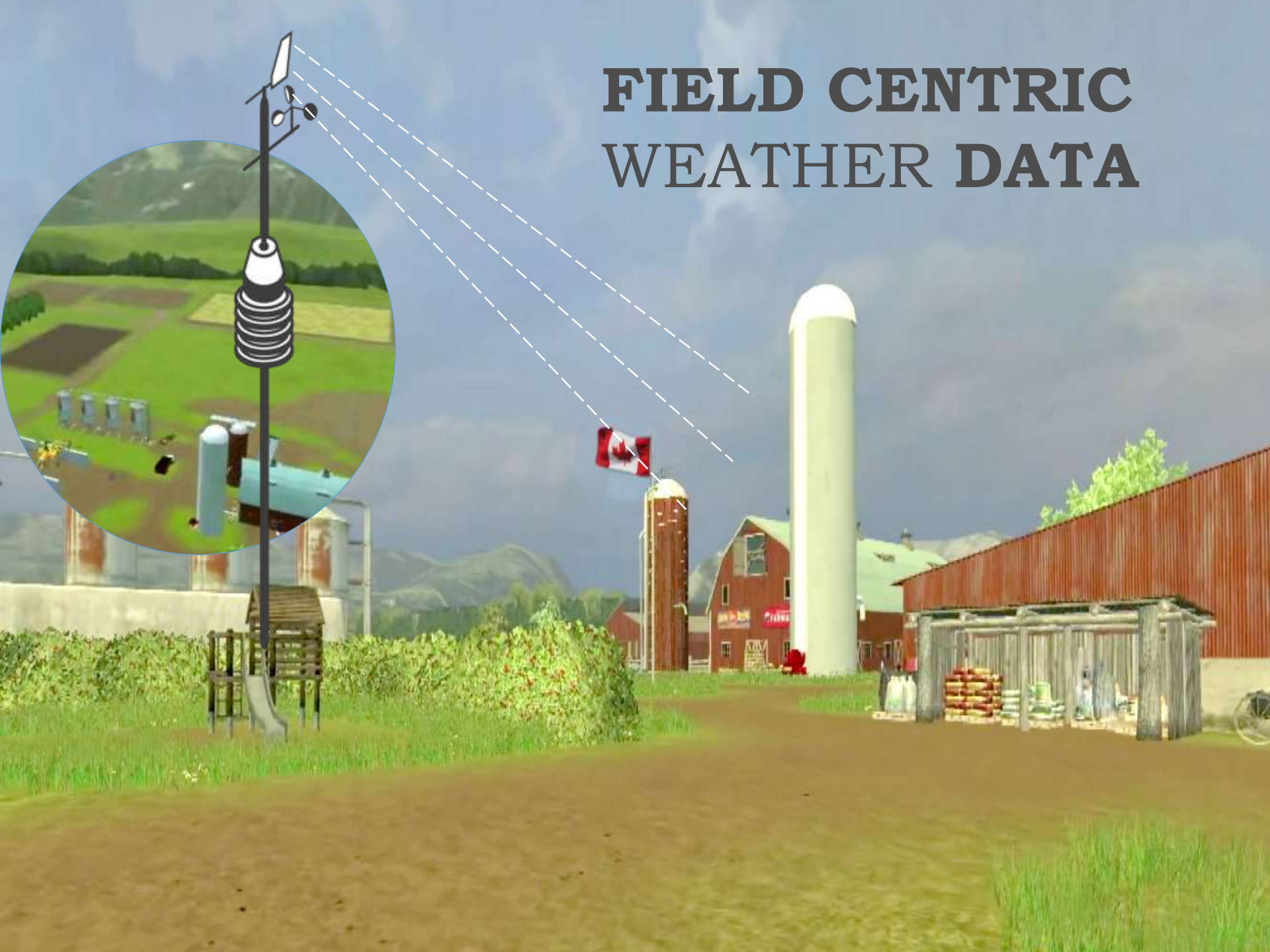
FarmersEdge™

YIELD **VARIABILITY**

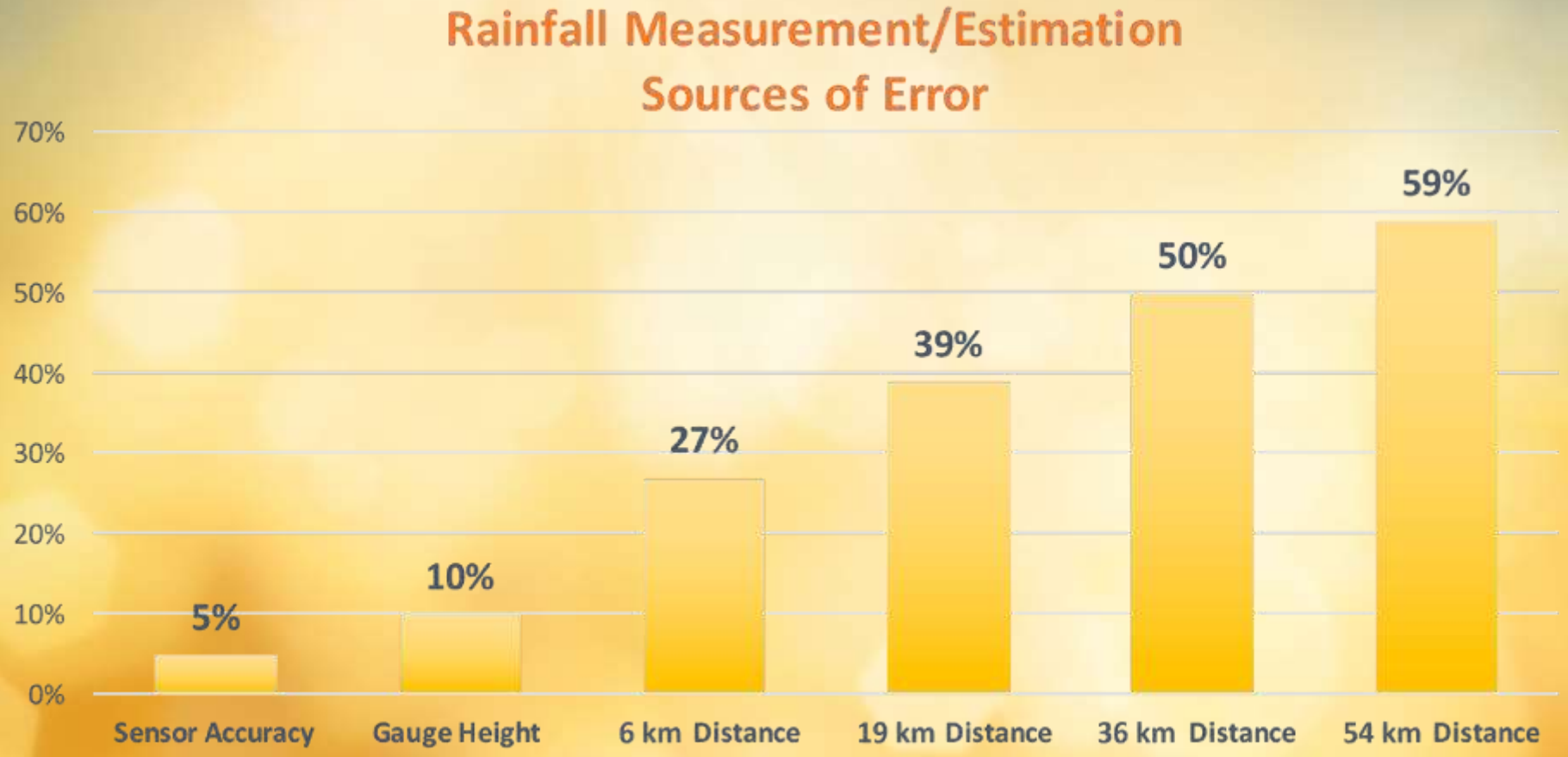
- Over half of yield variability can be explained by weather variability *(Dzotsi, 2012).*
- Some estimates are as high as 80% *(Hoogenboom, 2000)*



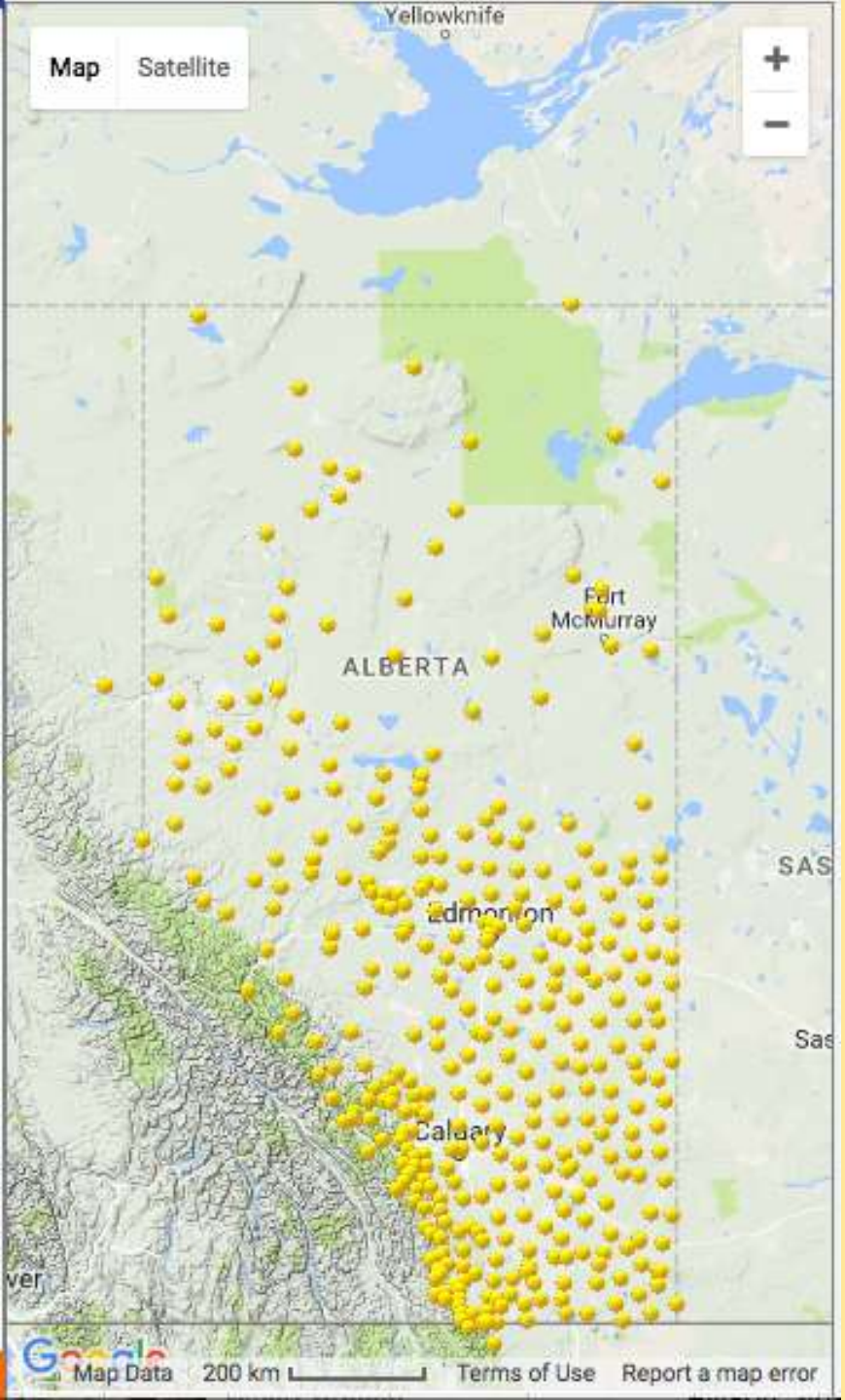
Dzotsi, K.A. 2012. Rainfall Variability Effects on Aggregate Crop Model Predictions PhD Dissertation, University of Florida
Hoogenboom, G. 2000. Contribution of agrometeorology to the simulation of crop production and its applications. 103: 137-157.

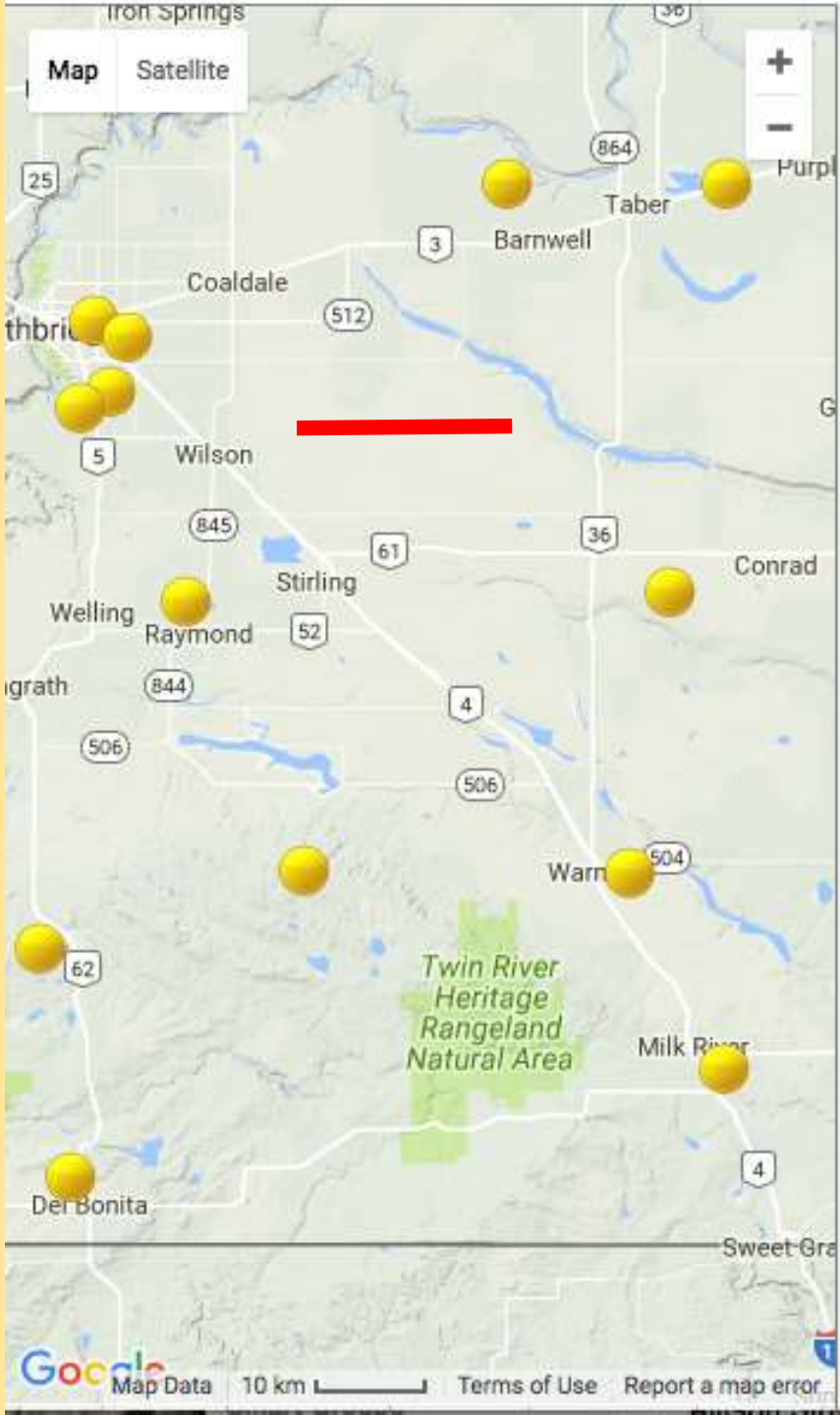

FIELD CENTRIC
WEATHER DATA

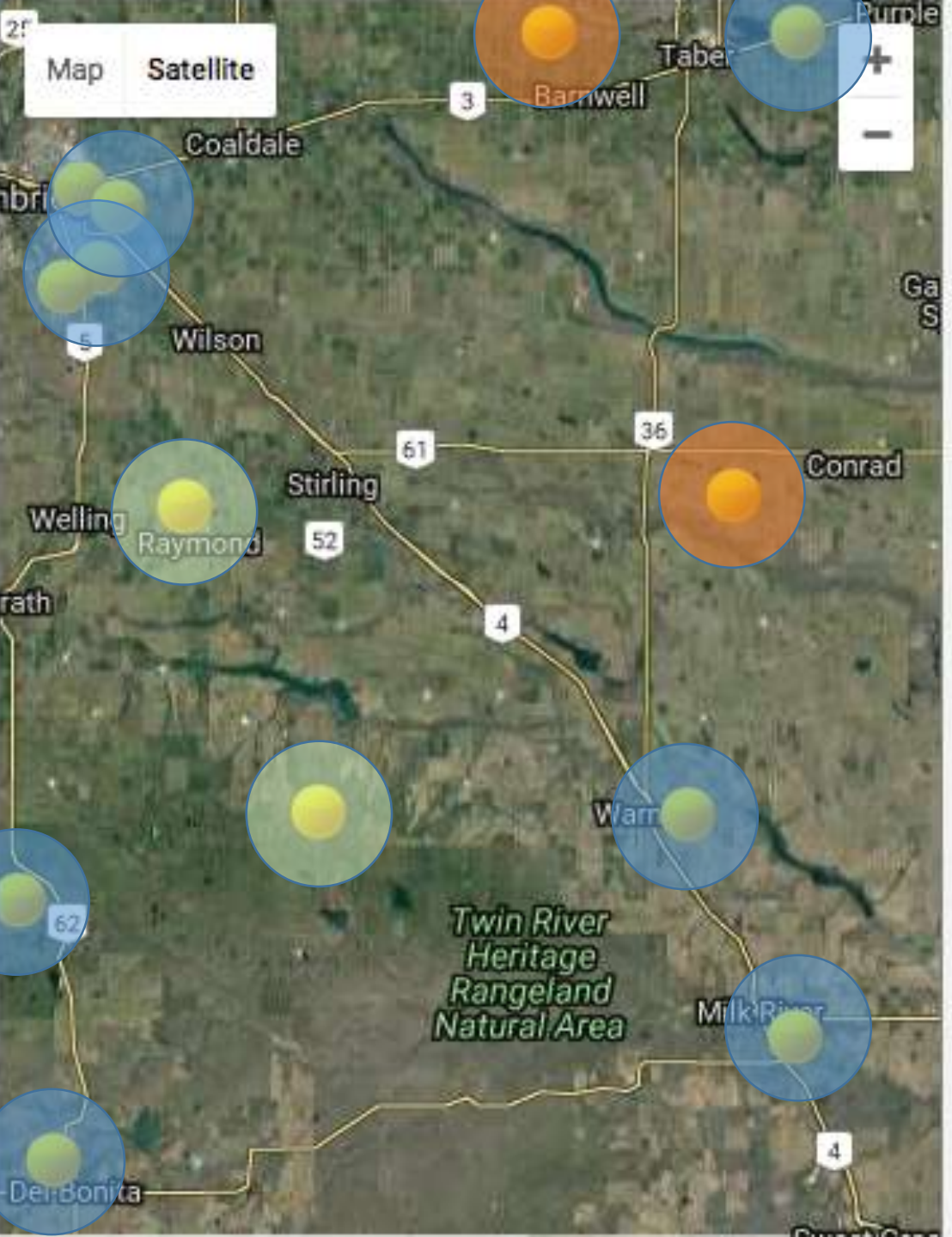
STATION DENSITY



Distance errors based on Ahrens 2006; Sensor accuracy based on published specifications; Height errors based on Kurtyka 1953 ;


Map
Satellite
Yellowknife
Fort McMurray
ALBERTA
Edmonton
Calgary
Map Data
200 km
Terms of Use
Report a map error


Map
Satellite
Iron Springs
25
864
Taber
Barnwell
3
Coaldale
512
5
Wilson
845
61
36
Conrad
Stirling
Welling
Raymond
52
844
4
506
506
504
62
Twin River Heritage Rangeland Natural Area
Milk River
4
Del Bonita
Sweet Gra
Map Data
10 km
Terms of Use
Report a map error

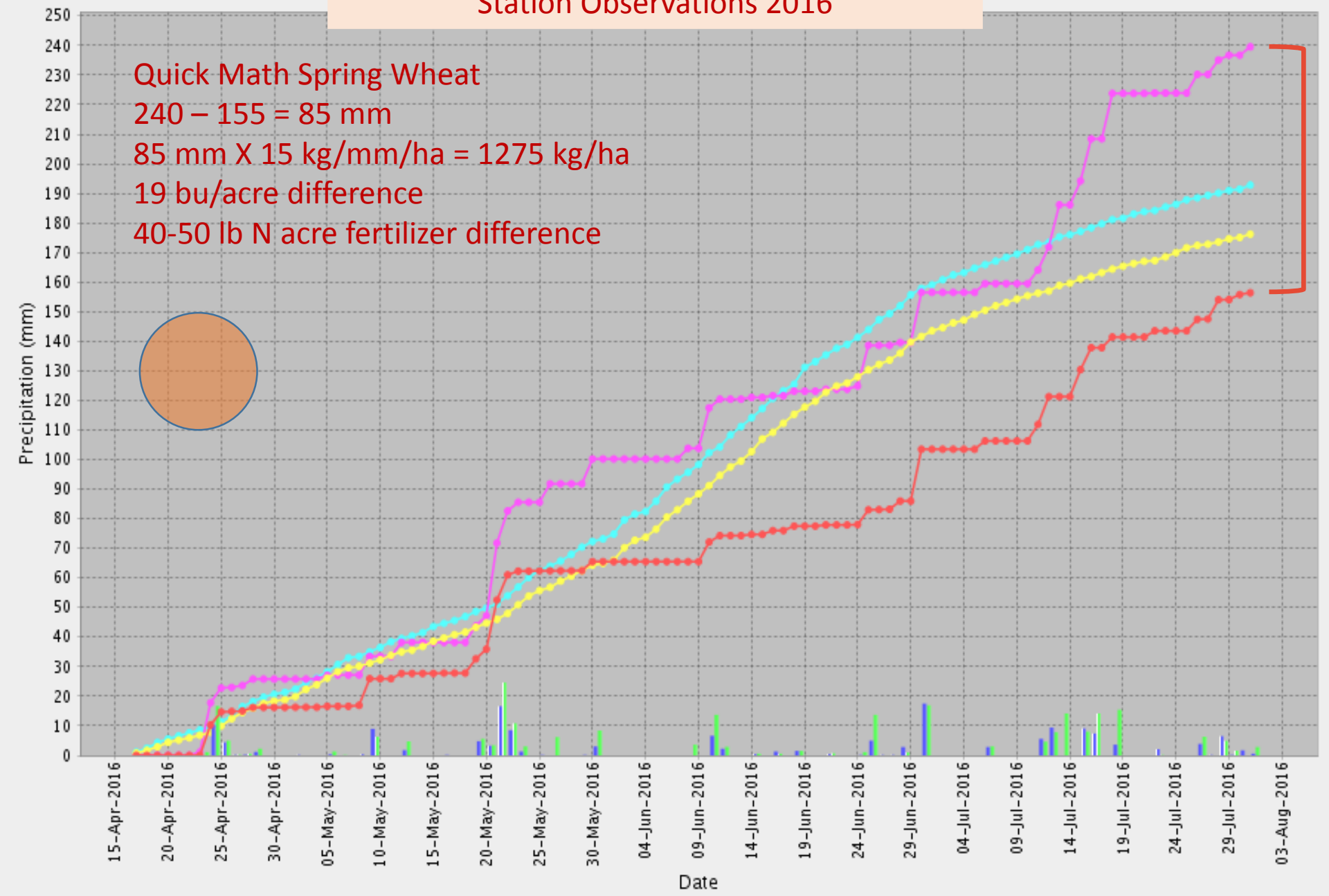


6 km radius
39 km apart

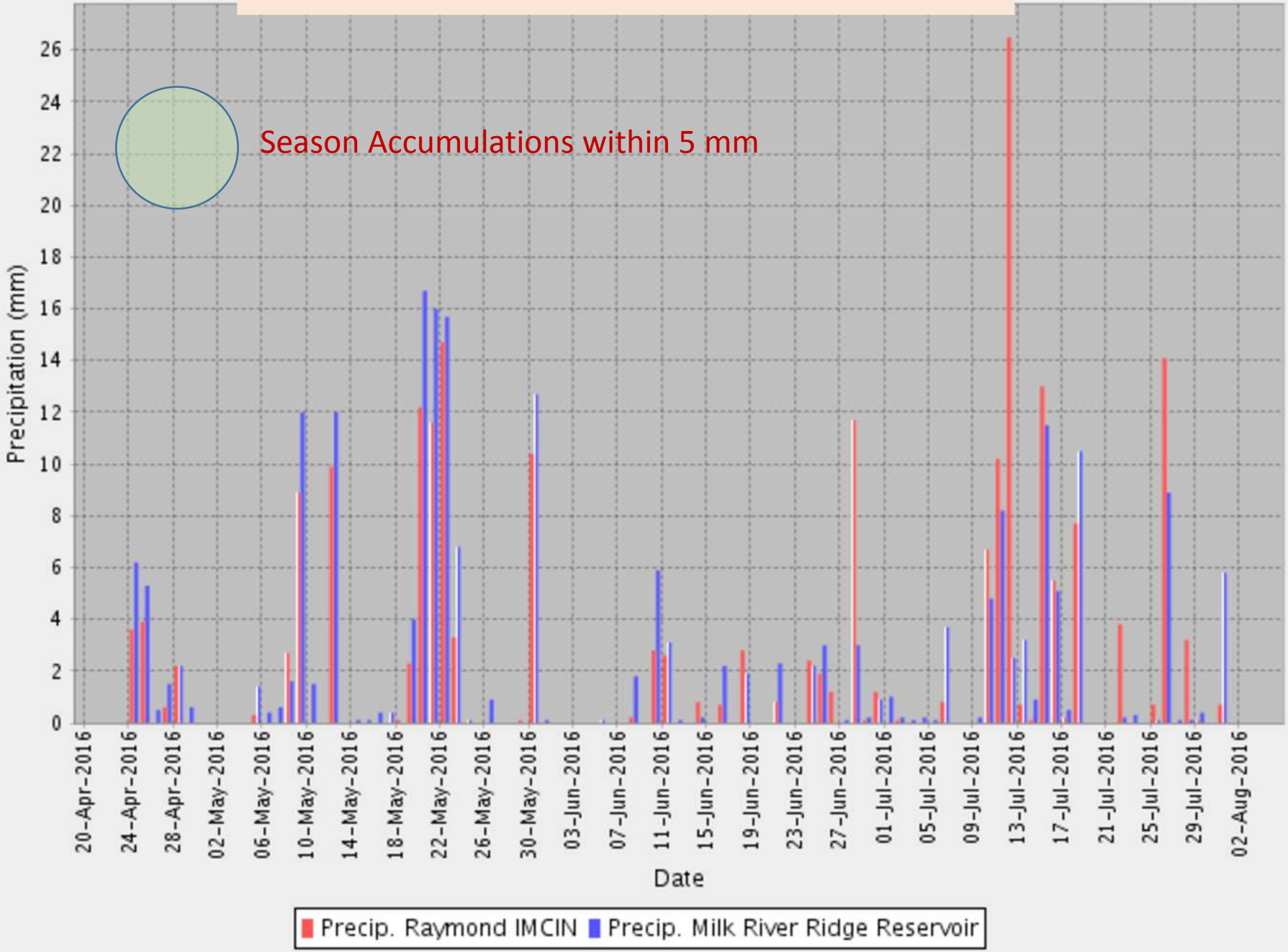
<20% of fields are within 6 km of a weather station.

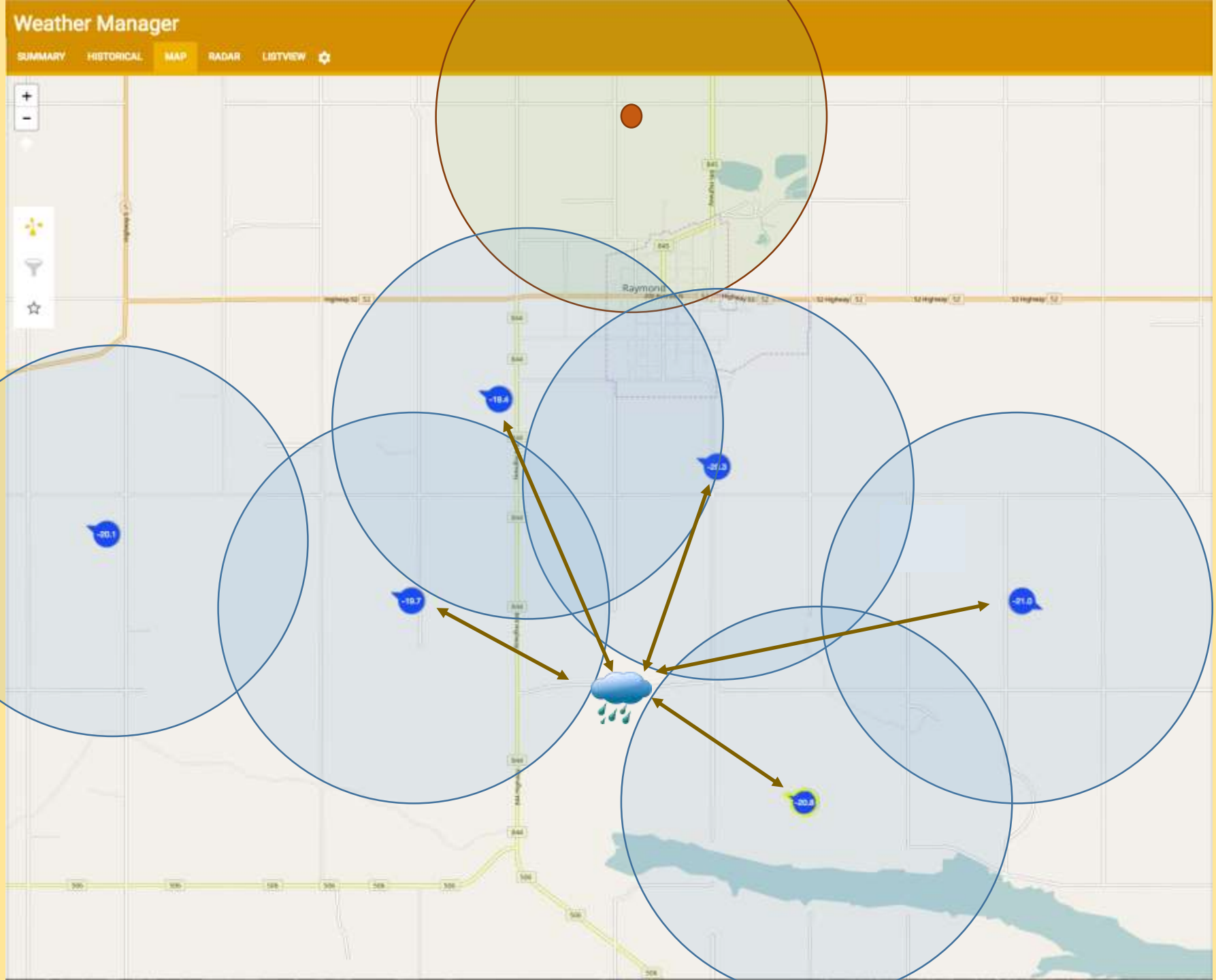
6 km radius
30 km apart

Station Observations 2016

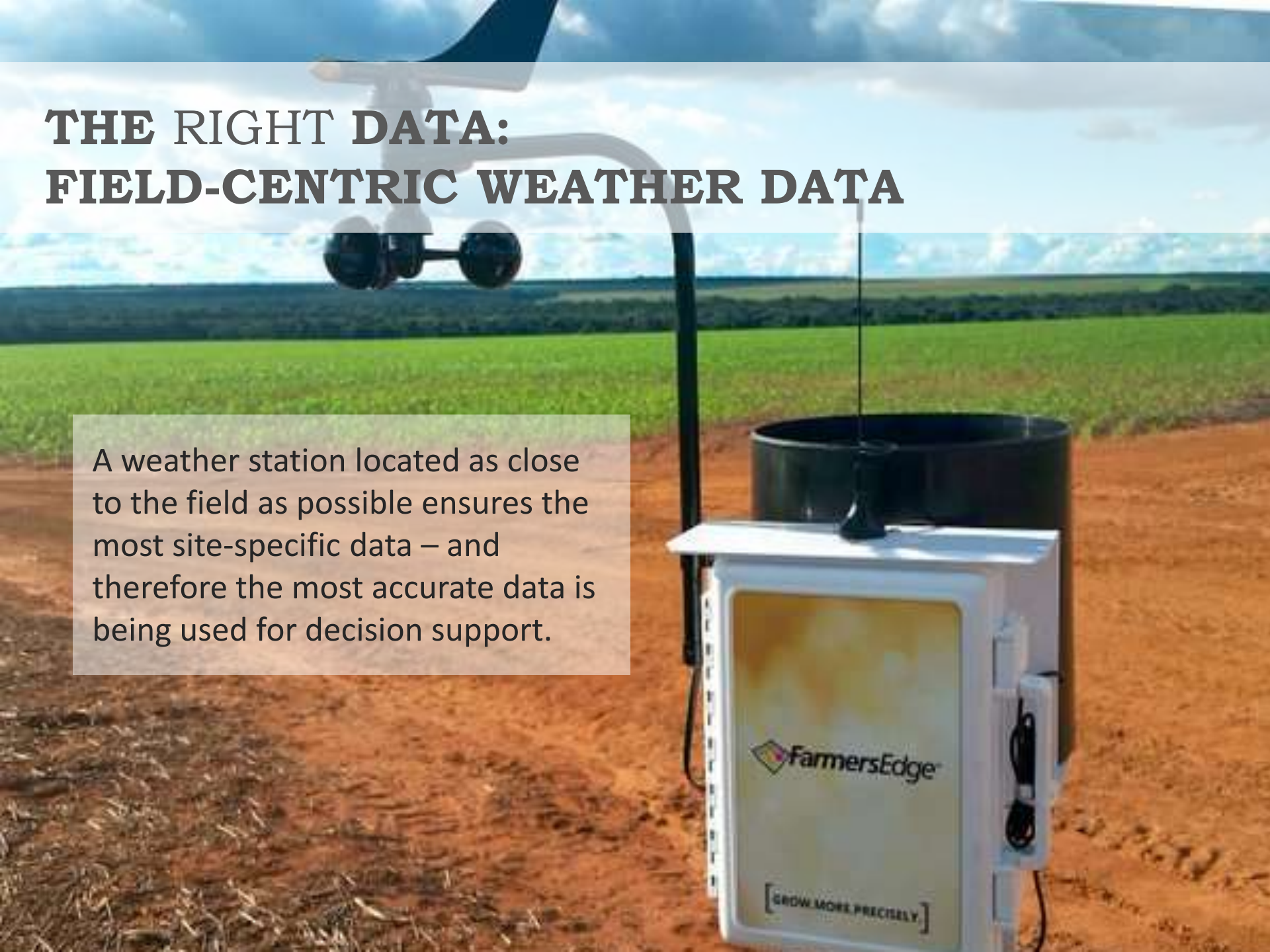


Station Observations 2016




Weather Manager
SUMMARY
HISTORICAL
MAP
RADAR
LISTVIEW
Raymond
-19.4
-20.1
-19.7
-21.0

THE RIGHT DATA: FIELD-CENTRIC WEATHER DATA



A weather station located as close to the field as possible ensures the most site-specific data – and therefore the most accurate data is being used for decision support.

Dashboard

FarmCommand

Grower: East Raymond Farming | Farm: East Raymond Farming | Season: 2017

Weather

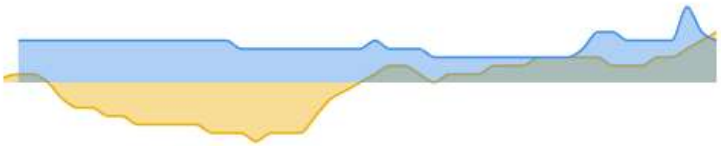
Coaldale SW

Sun, 01:25 pm
Mostly Cloudy

0.6 °C

Feels Like: –

POP: –
Amount: –
RH: 58%
Gust: 40.2 km/h
Wind: 30.6 km/h from W



02 pm 08 pm 02 am 08 am 02 pm 08 pm 02 am 08 am

Sun, 01 pm

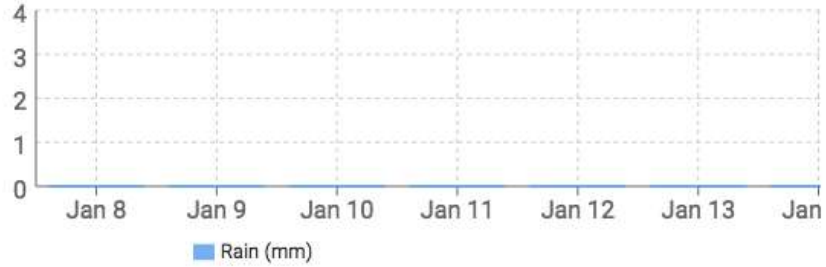
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1.0 °C	2.0 °C	6.0 °C	9.0 °C	8.0 °C	5.0 °C	2.0 °C
-7.0 °C	0.0 °C	3.0 °C	2.0 °C	-1.0 °C	-5.0 °C	-3.0 °C
10%	10%	10%	10%	10%	10%	10%

High Low POP

Historical Weather

Coaldale SW

PAST 24 HOURS | PAST 7 DAYS | PAST 30 DAYS | PAST 6 MONTHS



(total: 0mm)

View weather summary

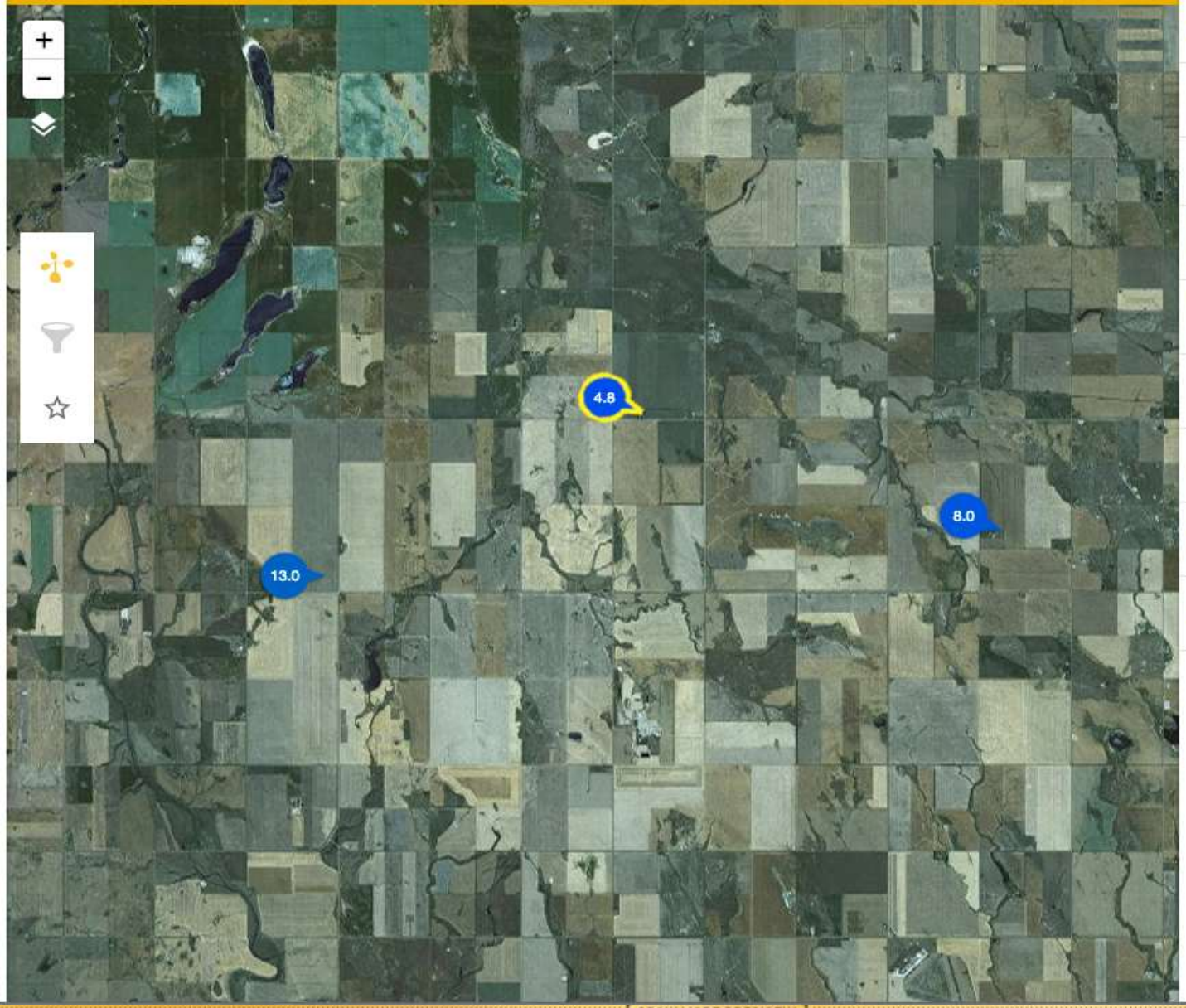
Notifications (East Raymond Farming)

Crop Health Dec 16
You have new crop health imagery: Field: 14, 15 Jensen (NN28-Sec 33-5-20 W4)
Image Date: 2016-12-16 22:08:00.959009 Field: 14, 15 Jensen (NN28-Sec 3...

Crop Health Nov 21
You have new crop health imagery: Field: 14, 15 Jensen (NN28-Sec 33-5-20 W4)
Image Date: 2016-11-21 14:29:23.825236 Field: 11 Gough (SEC 3-6-20 W4) ...

Weather Manager

SUMMARY | HISTORICAL | MAP | RADAR | LISTVIEW



Ensign S 2
CA-AB-0375

MOSTLY CLOUDY

63 % Relative Humidity

UPDATED
Sun Jan 15 11:30 am MST

1.0 °C Temperature

-2.0 °C Feels like

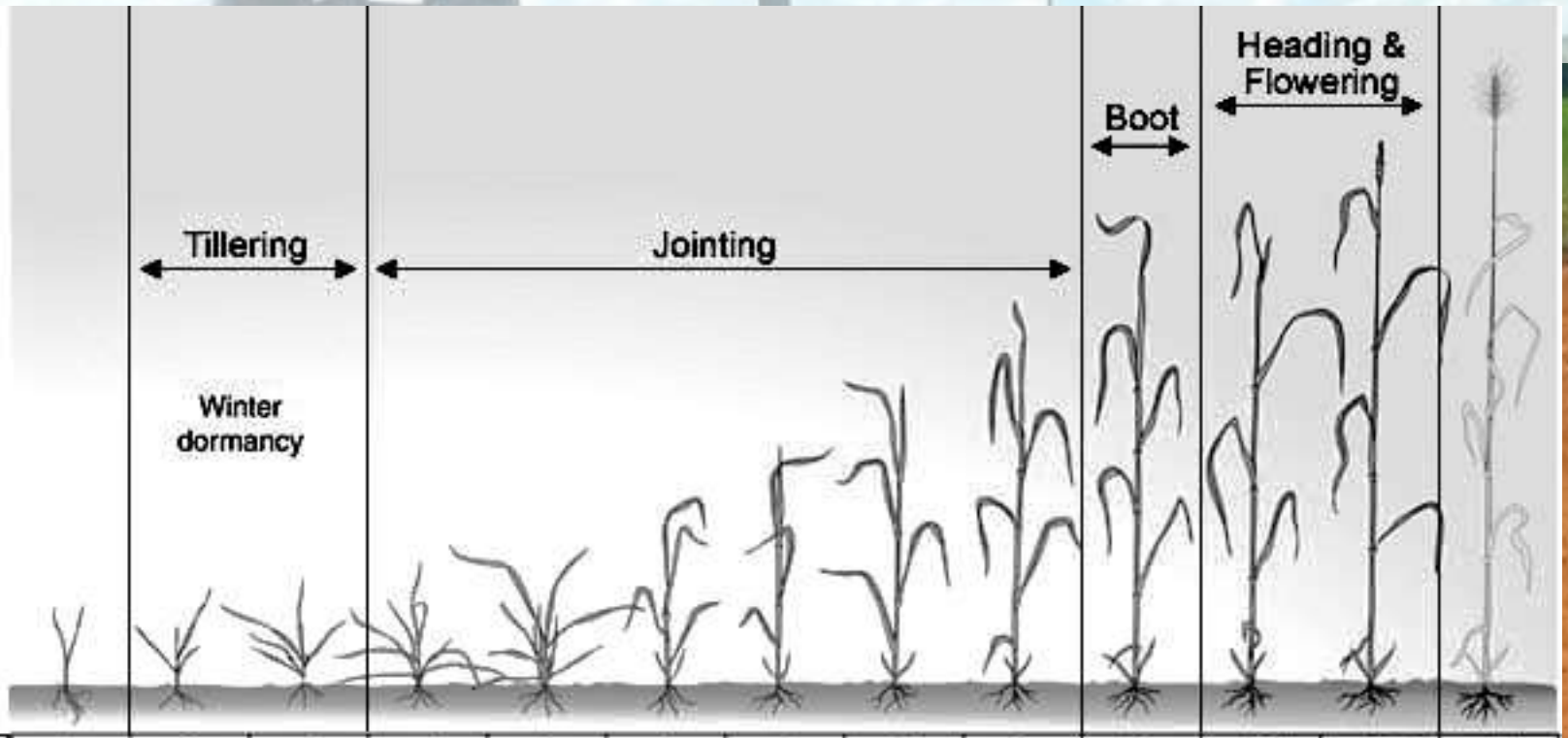
0.00 mm Rain (day)

4.8 km/h from WNW Wind

-- Wind Gust

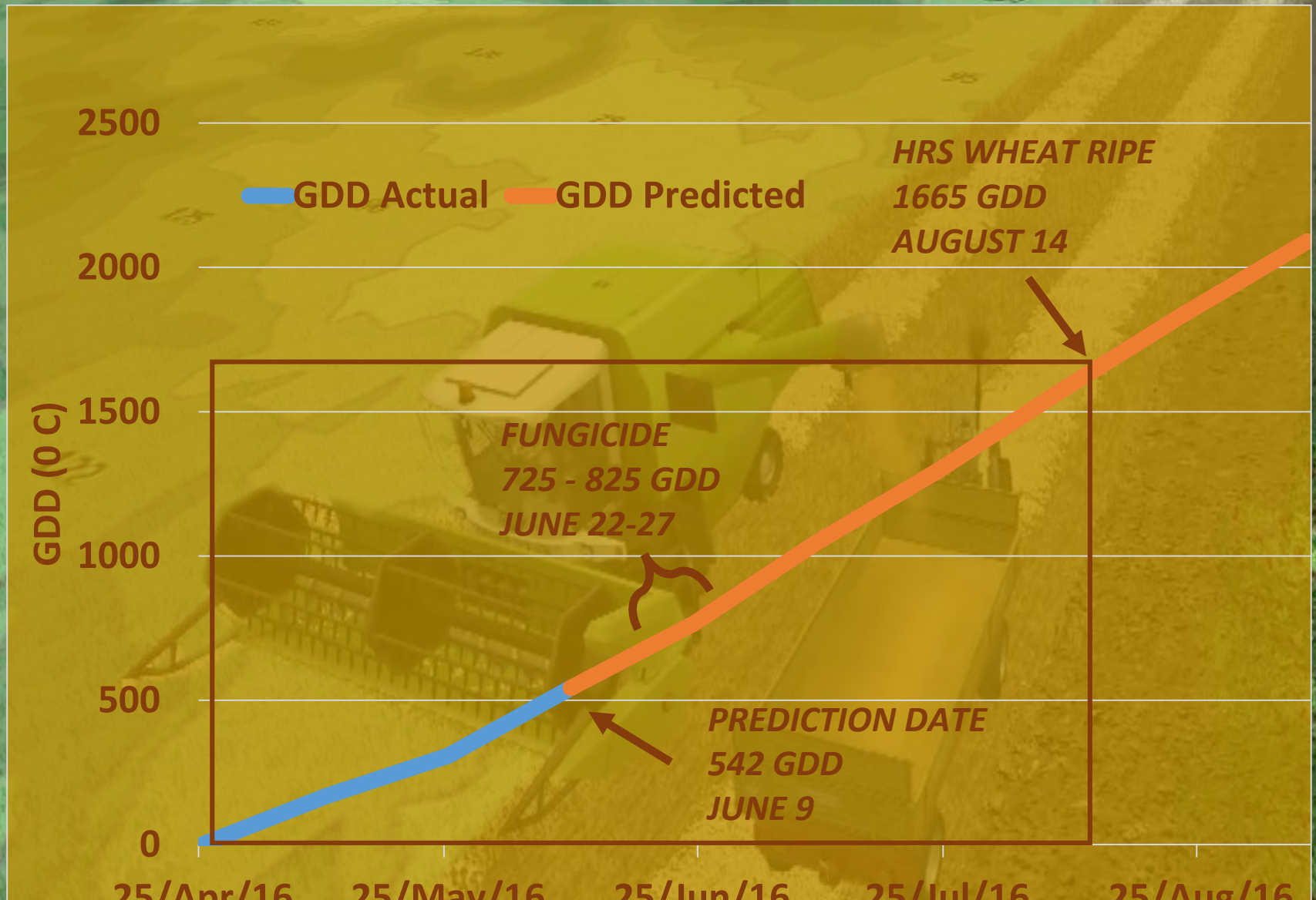
-- Dewpoint

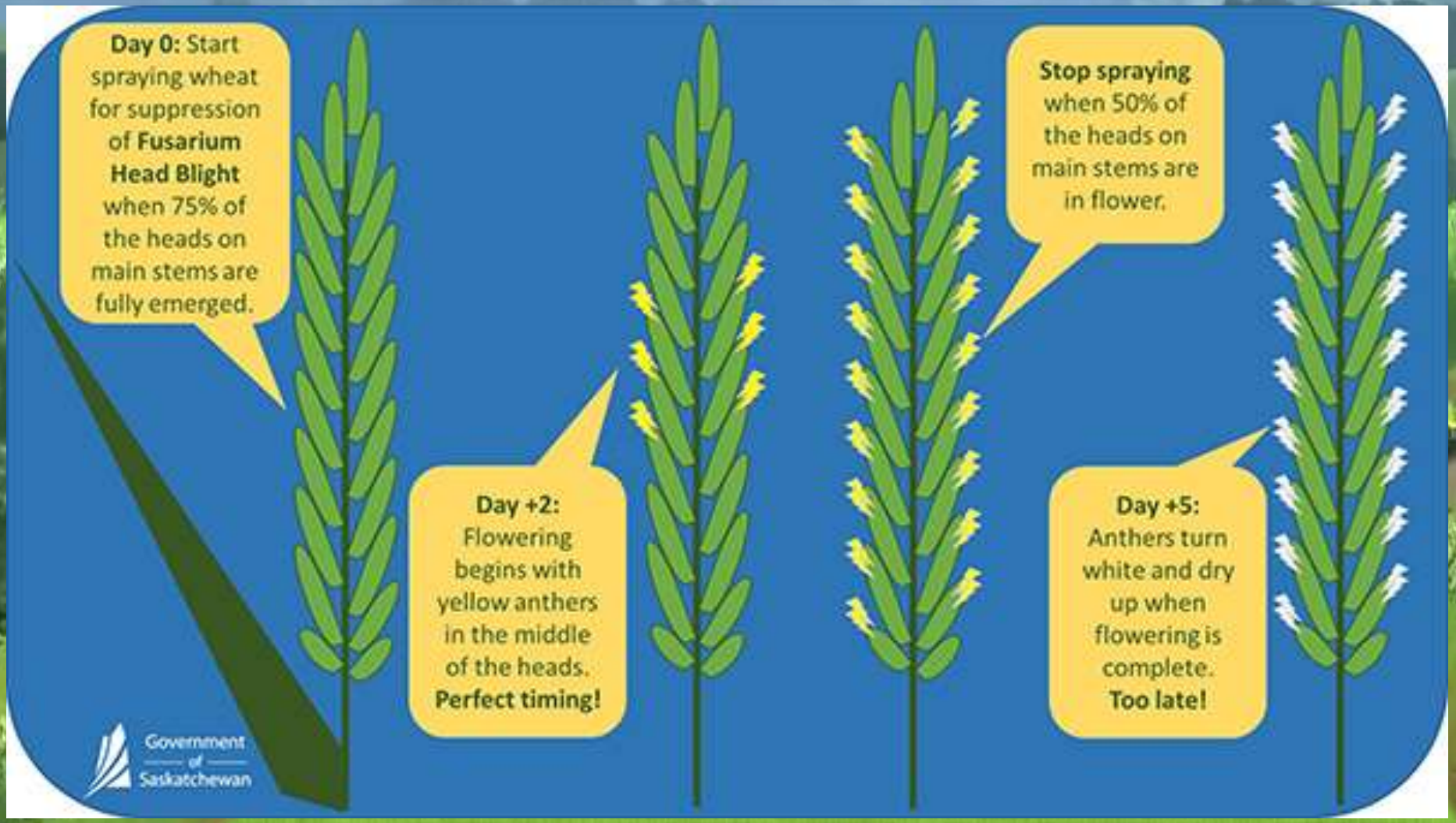
GROWTH STAGE



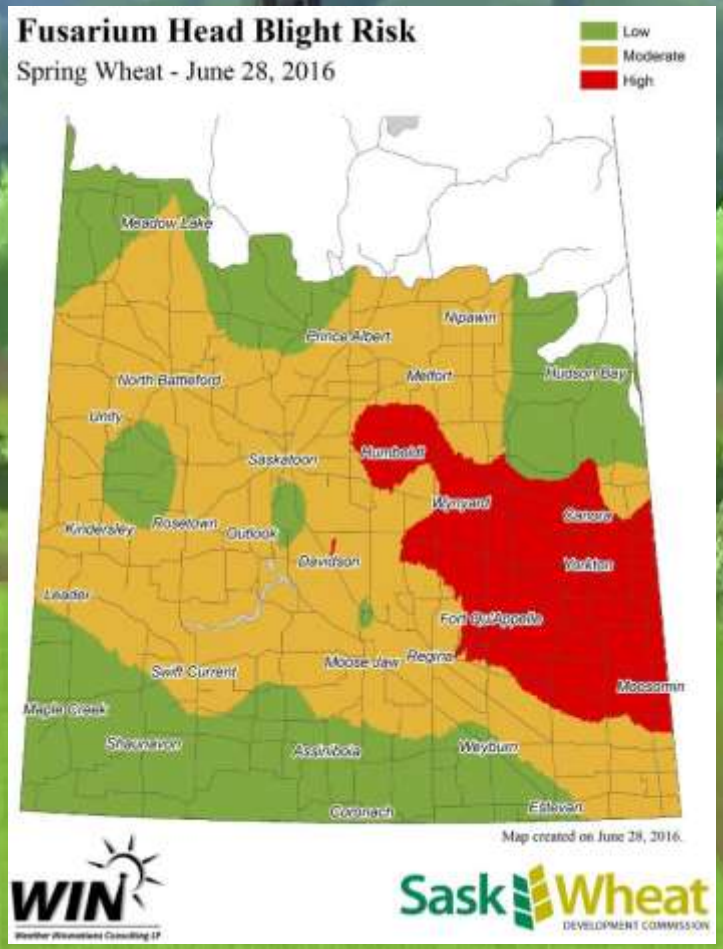
Feekes	1	2	3	4	5	6	7	8	9	10	10.1	10.5	11
Zadoks	10	21	26	30	30	31	32	37	39	45	50	60	90

PREDICTING GROWTH STAGE





SPRAYING WHEAT



SPRAYING WHEAT

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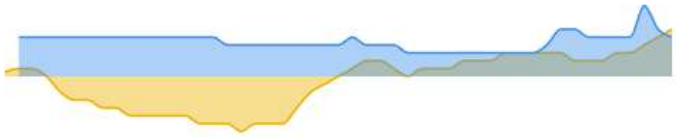

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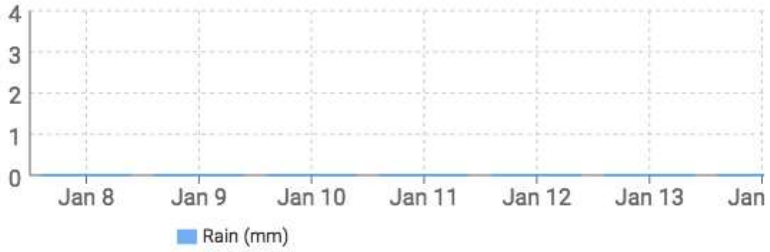

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SPRAYING WHEAT

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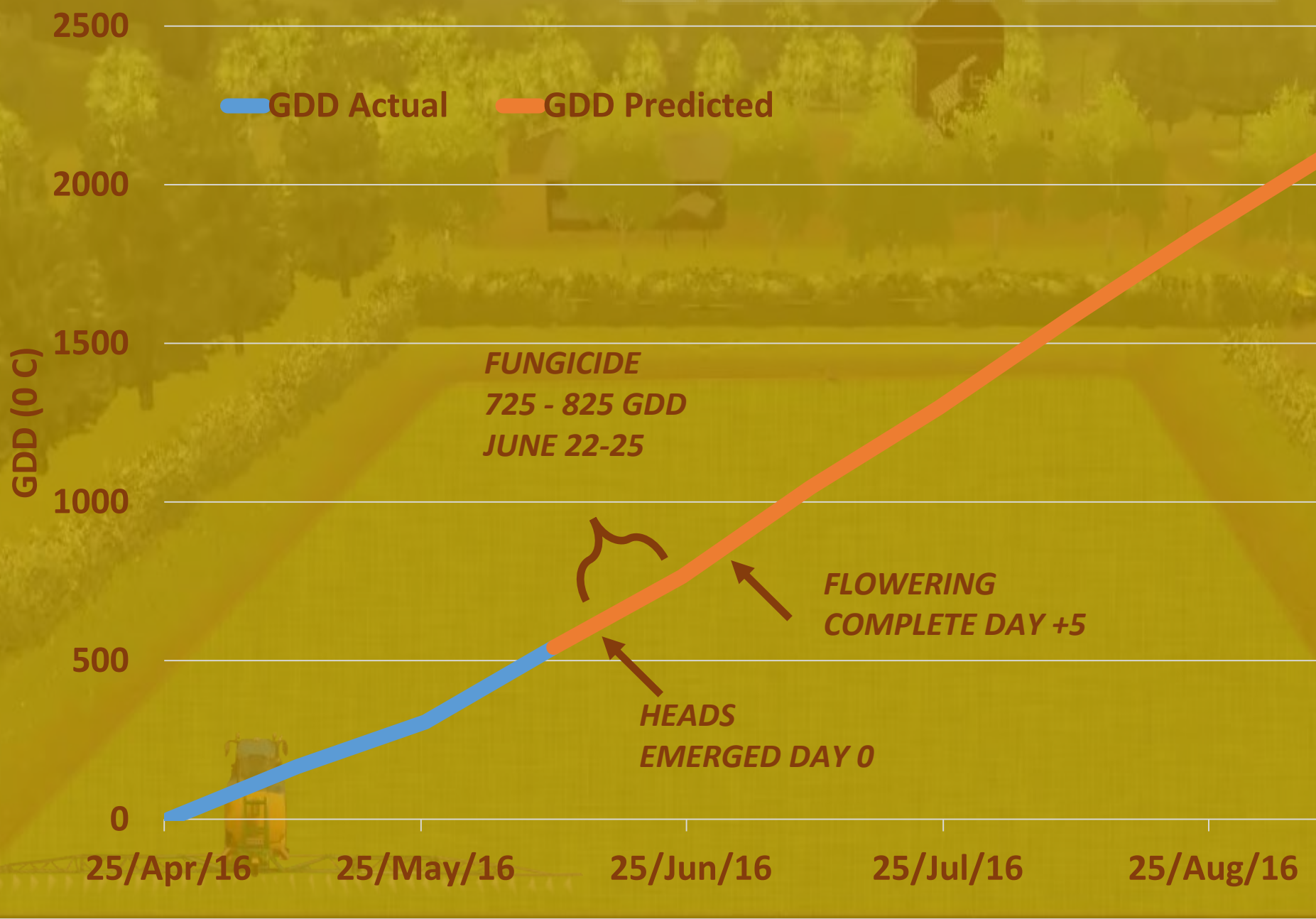


SPRAYING WHEAT

WHEAT: SPRAY OR NOT?

DO I SPRAY THIS
FIELD THIS YEAR?

If You Spray Product X in the next 5 to 7 days there is a 80% chance of an economic response.

FIELD OPERATIONS RECORDS

Spraying Wheat Equipment

SPEED	FUEL	ENGINE SPEED	WORK RATE
13 kph	30 litres/ hr	2100 rpm	90 acres/hr

Spraying Wheat Weather

WIND	DIRECTION	TEMP	HUMIDITY
6 kph	SSW	21 ºC	38 %

Spraying Wheat Product

PRODUCT	RATE	WATER	CROP STAGE
FOLICUR	200 mL / acre	40 L/acre	59-60 Zadoks

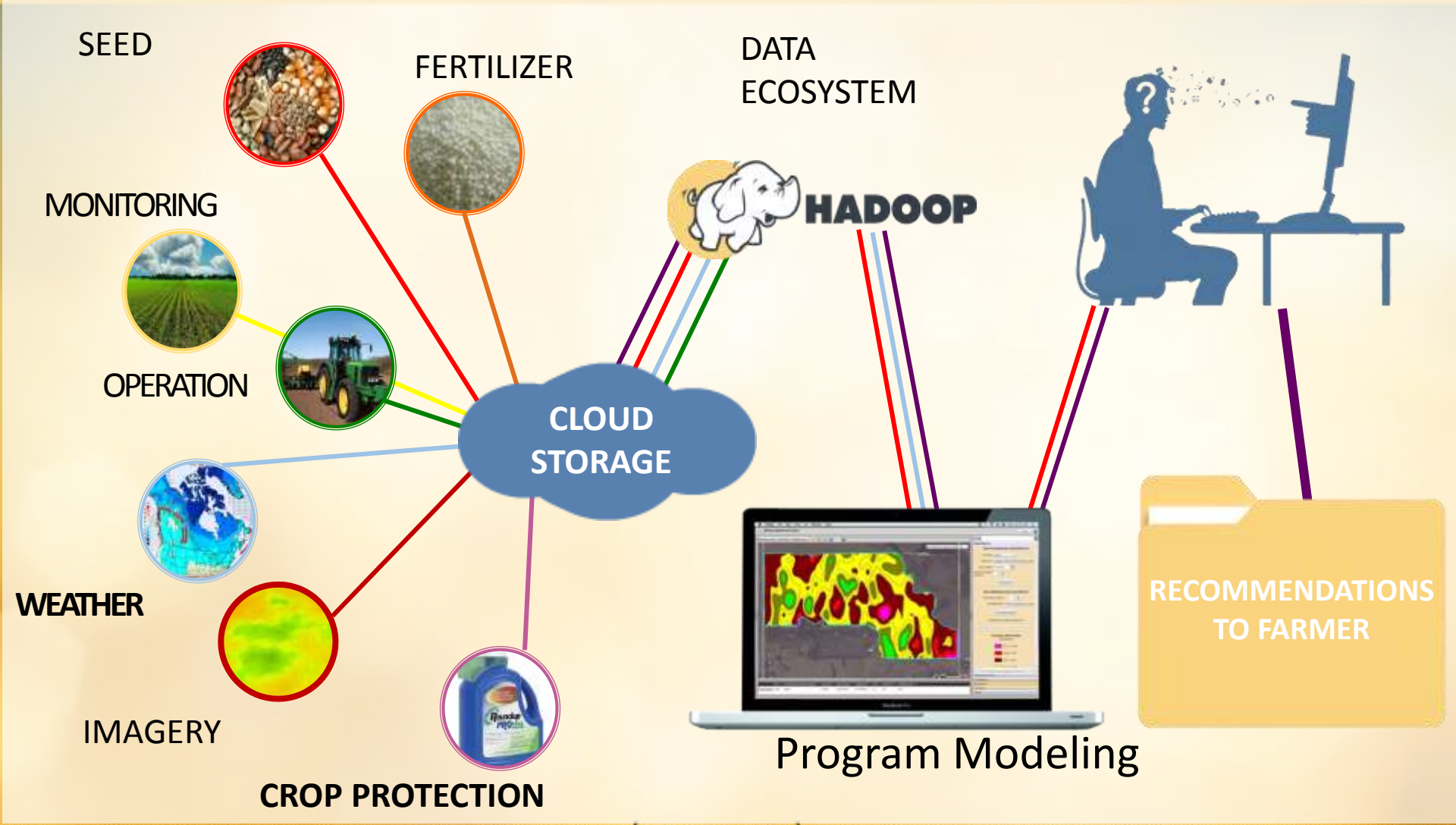
BIG DATA ANALYTICS

FarmersEdge

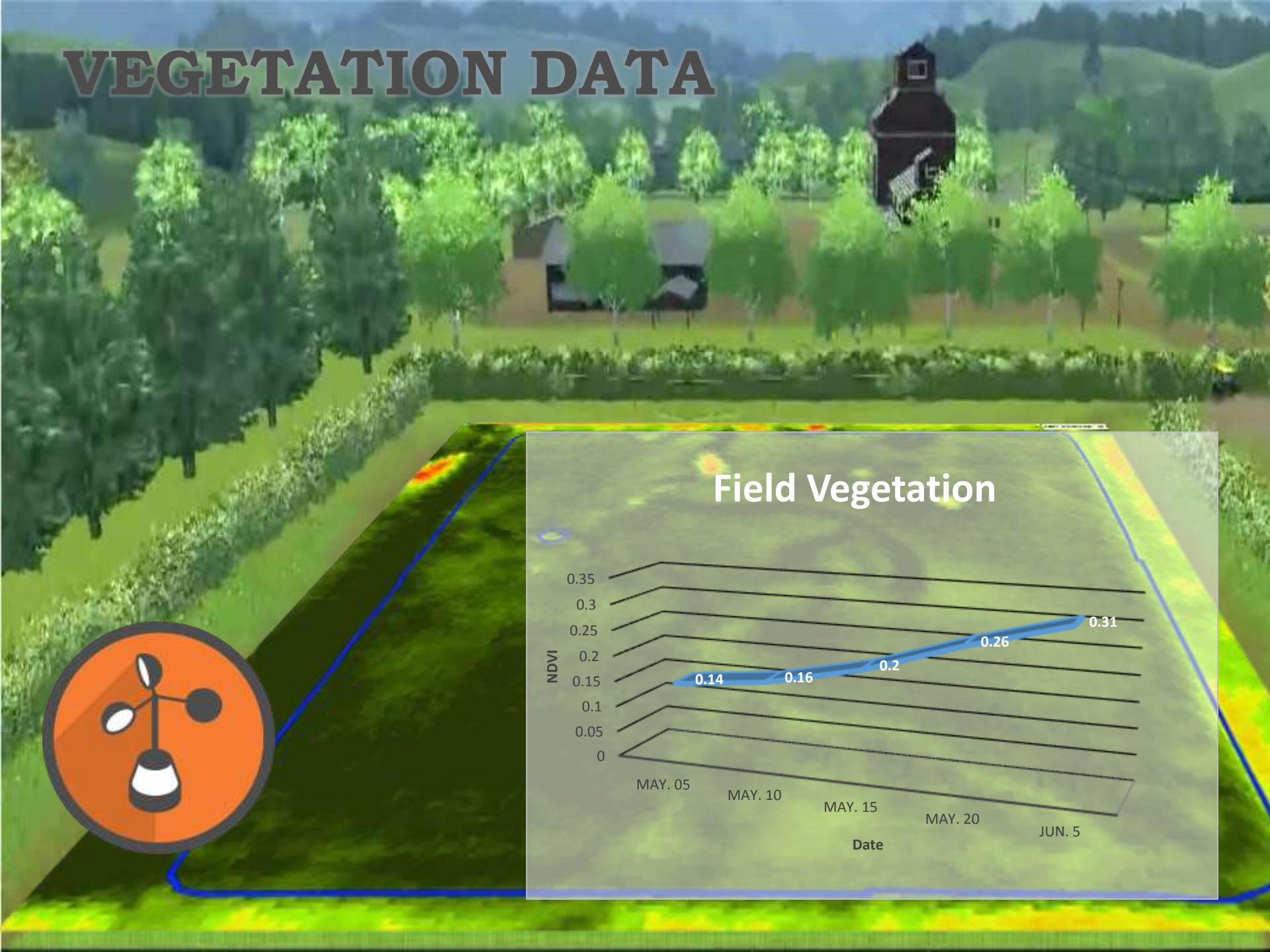
Big Data refers to data sets that are too large or complex for traditional data processing and analytical approaches.

Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying, and information privacy.

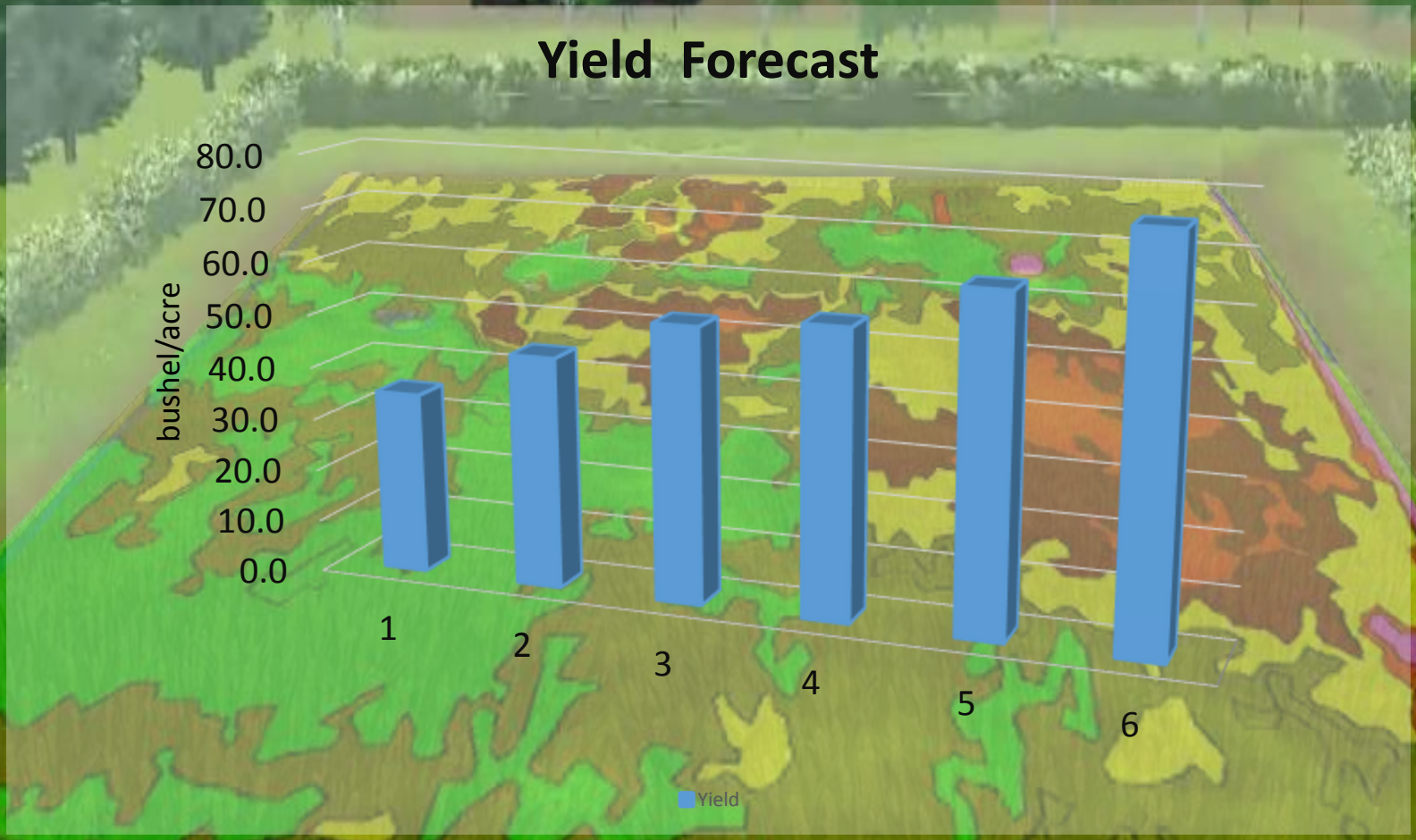
THE THIRD REVOLUTION – BIG DATA



VEGETATION DATA



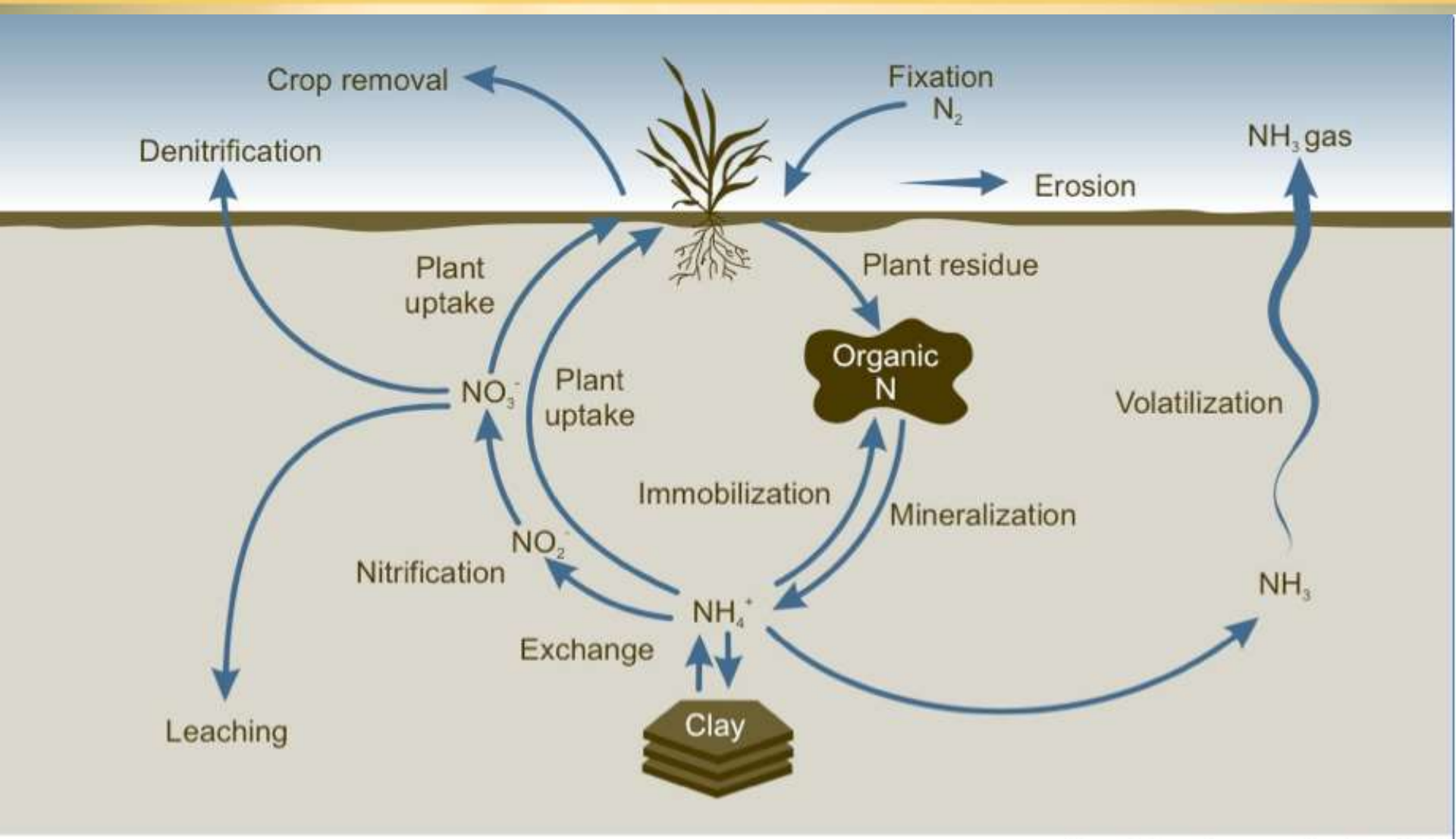
MID - SEASON YIELD FORECAST DATA



SIMULATION MODELLING

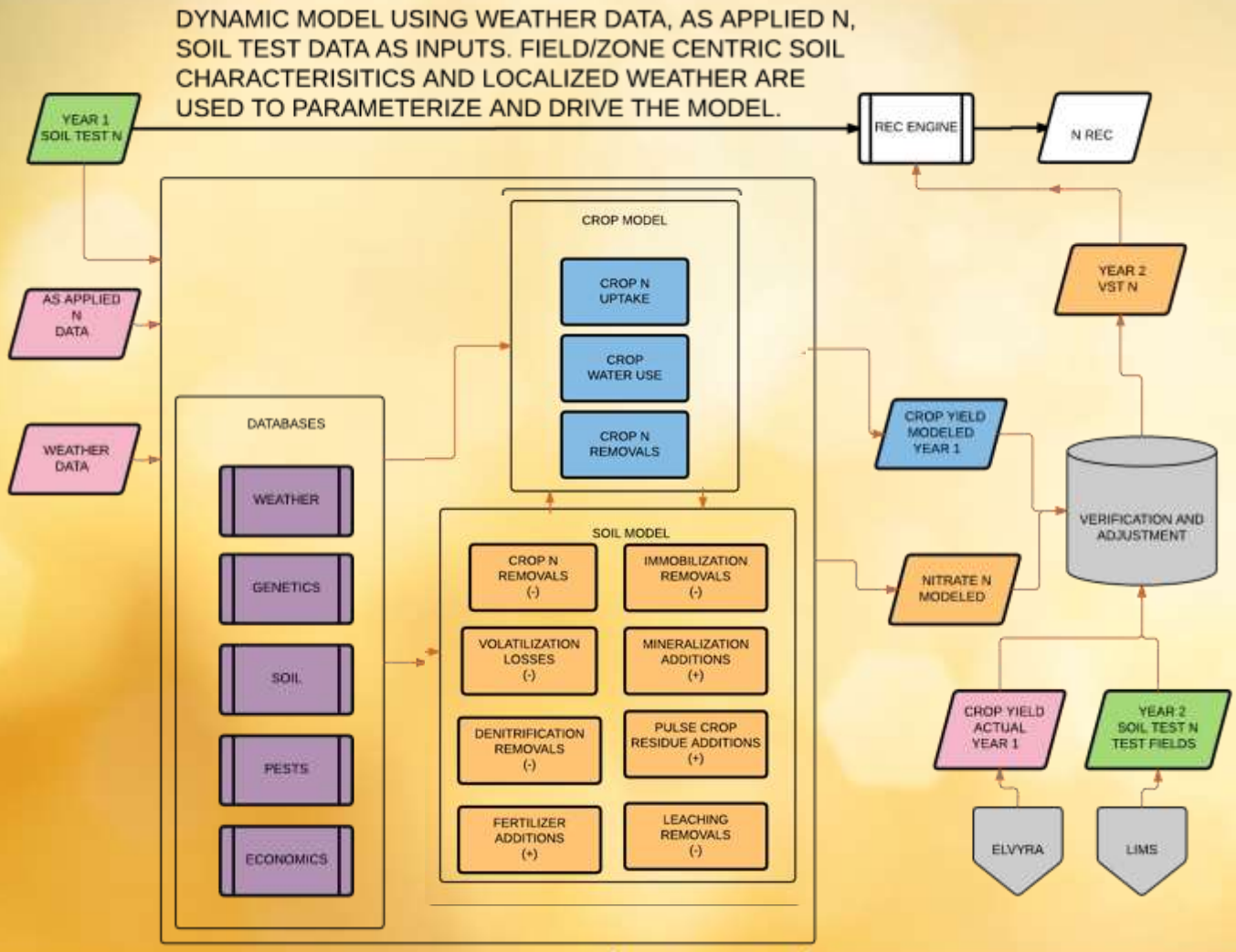
Models that explicitly or mechanistically simulate cropping system processes and generate outputs such as biomass accumulation, yield, nitrogen leaching loss etc. from inputs variables relating to soil, ***weather***, and management practices.

NUTRIENTS & WEATHER

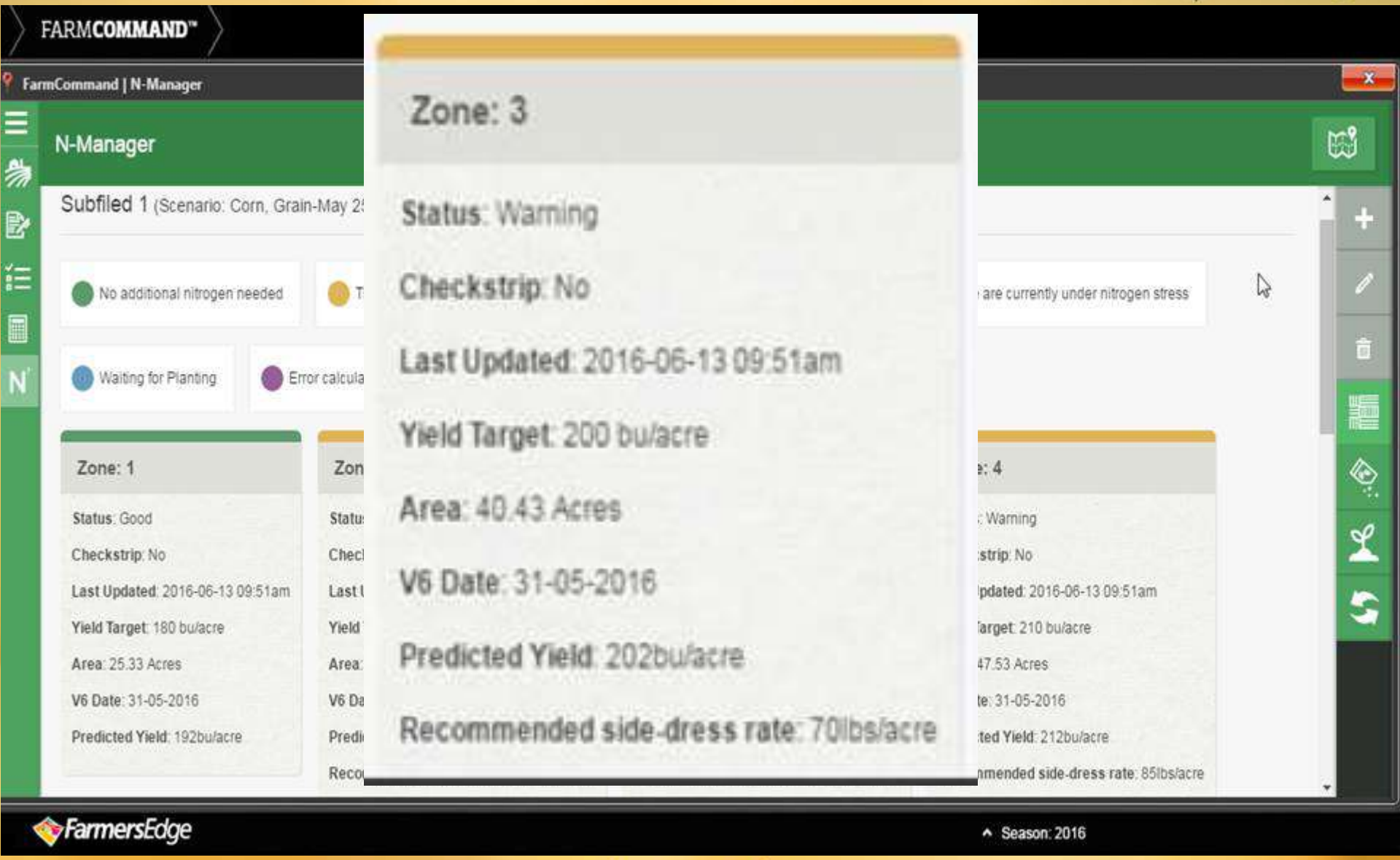


Adapted from Jones and Jacobsen 2001

MODELLING NITROGEN



N-MANAGER


FARMCOMMAND™
FarmCommand | N-Manager
N-Manager
Subfiled 1 (Scenario: Corn, Grain-May 2
No additional nitrogen needed
are currently under nitrogen stress
Waiting for Planting
Error calcula
Zone: 1
Status: Good
Checkstrip: No
Last Updated: 2016-06-13 09:51am
Yield Target: 180 bu/acre
Area: 25.33 Acres
V6 Date: 31-05-2016
Predicted Yield: 192bu/acre
Zone: 3
Status: Warning
Checkstrip: No
Last Updated: 2016-06-13 09:51am
Yield Target: 200 bu/acre
Area: 40.43 Acres
V6 Date: 31-05-2016
Predicted Yield: 202bu/acre
Recommended side-dress rate: 70lbs/acre
Warning
strip: No
pdated: 2016-06-13 09:51am
arget: 210 bu/acre
47.53 Acres
te: 31-05-2016
ted Yield: 212bu/acre
mmended side-dress rate: 85lbs/acre
FarmersEdge
Season: 2016

SUMMARY

- WEATHER DATA CAN INFORM DECISIONS
- THE MORE FIELD CENTRIC THE MORE USEFUL THE DATA
- AUTOMATION AND INTEGRATION OF WEATHER DATA UNLOCKS VALUE
- NEW ANALYTICAL TECHNIQUES WILL DRIVE NEW WAYS TO USE WEATHER DATA

FINAL WORD

FarmersEdge

YOU CAN'T MANAGE THE WEATHER BUT THE MORE YOU KNOW ABOUT THE WEATHER THE BETTER YOU CAN MANAGE

FarmersEdge

[THANK YOU]

FOR BEING ON THE EDGE