



Digital Farming

Solutions for Every Farm

Hamburg; 12 June 2018

Roslyn Chua



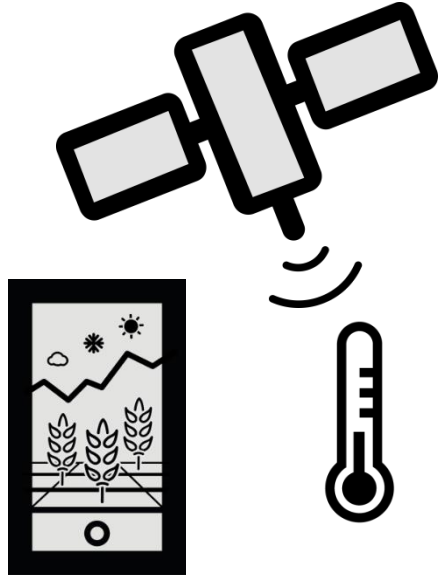


Agenda

- // Key Trends driving adoption of digital technologies in farms globally
- // Case studies on different business models in the industry
- // Bayer Digital Farming – key principles



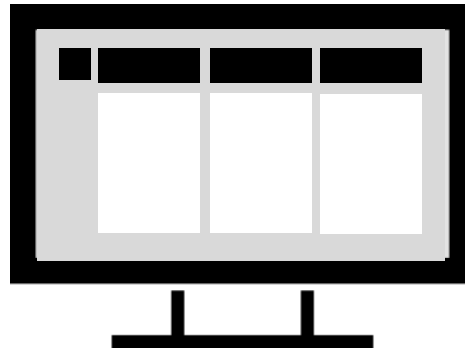
How Digital Farming Solutions Work



Mobile Products/Sensors

Data

Understand what happens locally!



Command Centre

Agronomic Decision Engine

**Analyze and plan agronomy!
Keep the overview!**



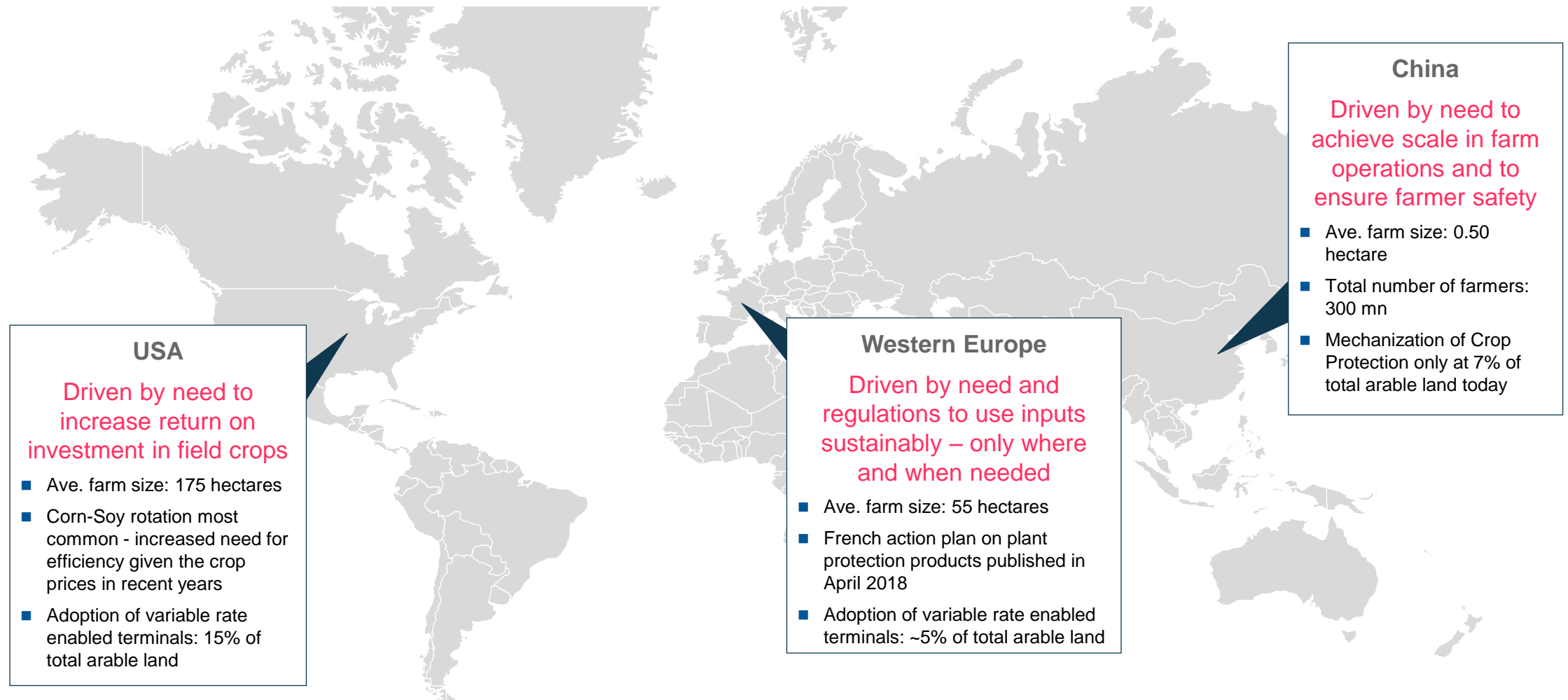
Crop Protection + field specific timing + variable application maps

Decision Support

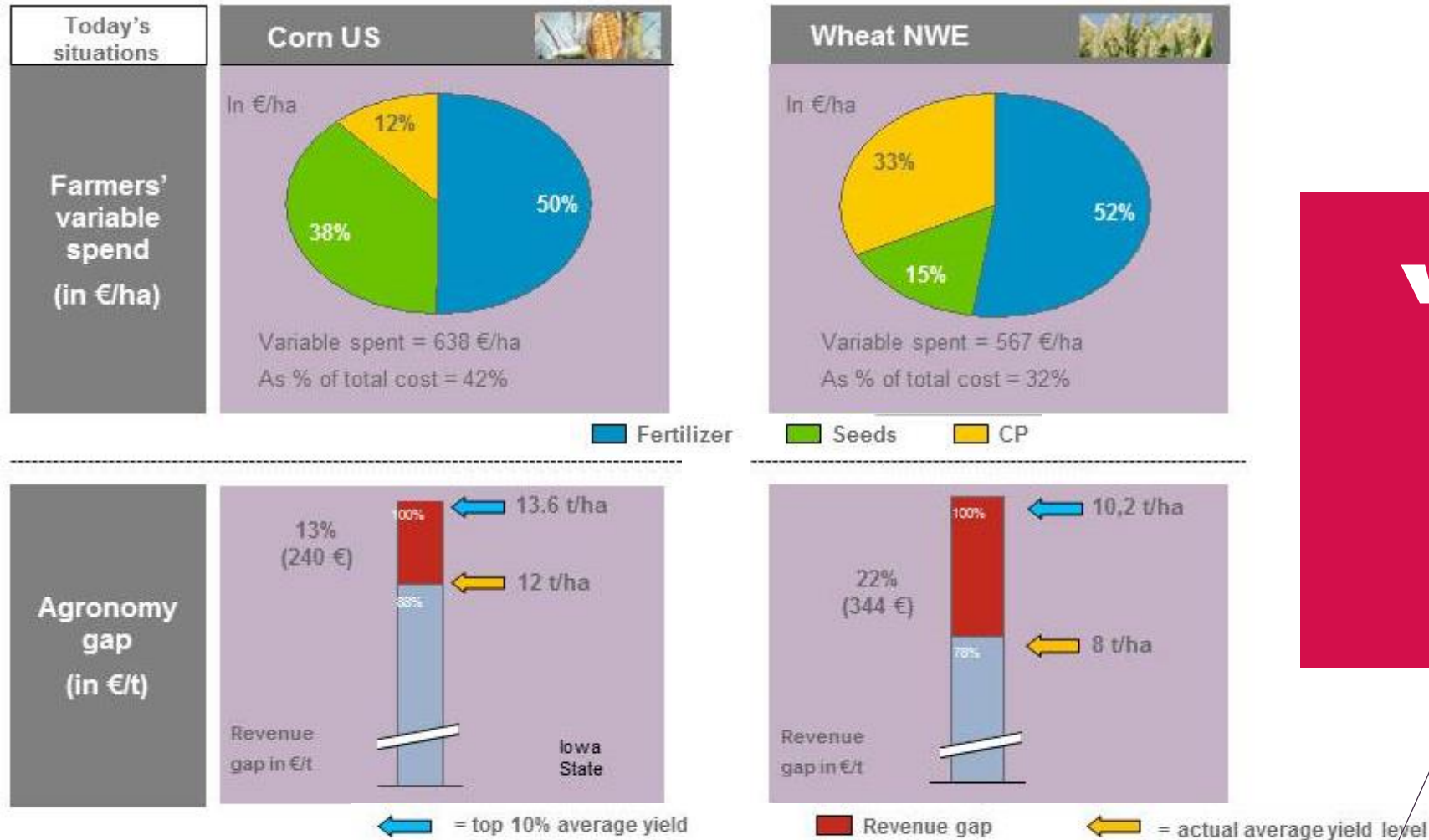
Do!



Key trends driving adoption of digital solutions globally – different needs are giving rise to different solutions



Different crops, geographies offer different optimization potential



Ensure relevance by providing solutions on key job steps //



Founded in 2014, Farmers Business Network (FBN) is a farmer-to-farmer agronomic information network.

Through crowdsourced data, FBN provides recommendations on seeds, fertility, and crop protection. In addition, it sells generic products directly in their platform as well as connecting farmers to buyers of their crop.

Key Points:

- 17Mn Paid acres – one of the leaders in direct to farm engagement
- Raised ~US200 Mn funding to date (Temasek, Google Ventures)



Seed Finder

Price Transparency
New

Analyze My Operation

Procurement

FBN Intelligence

My Data

FBN Performance

Trial Data

Search for variety



Crops: Year: State: Relative Maturity: Brand: Soil Type: ☒ Soil Texture: ☐ Soils: Previous Crop: Irrigation: Drainage:

Variety	Relative Maturity (days)	Acres in FBN	FBN Avg. Yield (bu/A)	Typical Yield Range	Avg. Price per Bag	Approximate Price Range
STINE® - R9808E	114	2,494	253.7	243.0 - 268.4		
DEKALB® - DKC63-72	113	950	243.7	204.4 - 284.7		
GREAT LAKES - 6462	114	2,587	240.6	227.2 - 259.1		
MYCOGEN® - 2J794	115	980	240.5	233.1 - 252.8		
BECK'S™ - 5665	106	879	239.1	229.3 - 251.5		
WYFFELS® - W7508	113	317	238.4	217.7 - 262.3		
WYFFELS® - W7456	112	512	238.0	220.8 - 260.1		
PRODUCERS HYBRIDS® - ...	112	2,671	235.2	225.1 - 247.2		
BECK'S™ - 6418	114	477	234.3	230.6 - 239.2		
DEKALB® - DKC63-71	113	2,708	233.8	211.7 - 255.3		
DEKALB® - DKC61-52	111	1,557	232.9	209.3 - 263.1		
WYFFELS® - W8550	114	2,652	232.4	217.0 - 252.0		
WYFFELS® - W7158	111	898	232.1	216.0 - 253.9		
GOLDEN HARVEST® - F11...	113	1,615	231.3	226.0 - 236.4		
PRODUCERS HYBRIDS® - ...	116	3,069	229.5	216.2 - 249.5		
WYFFELS® - W7057	111	960	229.0	226.7 - 250.7		
SPECIALTY® - 42V843	112	524	228.8	226.1 - 242.3		
PIONEER® - P33Y75	115	857	228.7	216.6 - 248.0		
GOLDEN HARVEST® - G10...	110	464	228.7			
PIONEER® - P0825	108	4,494	228.3	214.8 - 244.7		
GREAT LAKES - 6530	115	508	227.9	204.9 - 250.1		
DEKALB® - DKC58-06	108	16,146	227.4	215.2 - 246.7		
PIONEER® - P0937	109	3,532	227.3	213.9 - 245.4		
PRODUCERS HYBRIDS® - ...	115	9,281	226.7	208.9 - 248.0		
DEKALB® - DKC63-17	116	518	226.5	208.8 - 248.8		

To view Seed Prices,
Contribute A Seed Invoice

Your prices will never be exposed to other farmers.
Prices are anonymized and aggregated to protect
your privacy.

[+ Add Invoice to Unlock Prices](#)

Or simply snap a photo of an invoice and email it to
data@farmersbusinessnetwork.com



Farm X

90 fields / 7,603.56 acres

2016

Corn

Benchmark
My Region

Overview

Fields

Varieties

Planting

Natural Features

Weather

Yield Potential

Maps

Yield Analytics

Properties

Soil Performance vs My Region

Soil Type	SPI	My Avg. Yield (bu/A)	My Operation vs My Region	
Martinsville	0.59	234.2		+7.6%
Sawmill	0.8	225.0		+3.4%
Rutland	0.59	225.4		+3.4%
Virgil	0.85	223.3		+2.9%
Brooklyn	0.82	223.8		+2.6%
Catlin	0.78	217.2		-0.4%
Brenton	0.9	215.3		-0.8%
Dana	0.81	215.3		-0.9%
Millbrook	0.9	213.1		-1.9%
Drummer-Milford	0.79	213.5		-2.1%
Harvard	0.85	212.0		-2.3%
Clare	0.91	211.8		-2.6%
Flanagan	0.91	210.8		-3.0%
Elburn	0.91	208.4		-4.0%
Milford	0.81	207.7		-4.5%
Raub	0.88	207.4		-4.7%
Plano	0.95	206.9		-4.9%
Pella	0.7	205.6		-5.4%
Proctor	0.85	205.1		-5.5%
Wyanet	0.61	204.6		-6.0%
Drummer	0.84	203.7		-6.2%
Toronto	0.86	202.7		-6.4%

Source: Farmers Business Network Website, Market Research



East Field

83.29 acres

Year

Crop

Benchmark
Benchmark

Overview

Varieties

Planting

Natural Features

Weather

Yield Potential

Maps

Corn

Soybeans

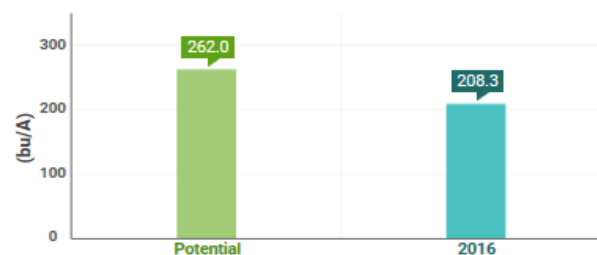
Wheat

70 - 129

All Brands

Potential Yield

Commodity Price: \$3.32



Potential Yield:

262.0 bu/A

vs Last Harvest

+25.8%

Potential Revenue/Acre

\$869.83 @ \$3.32/bu

Revenue Potential

\$72,570.75

Soil Type	Acres	Soil Productivity Index	Top Performing Variety in FBN	FBN Avg. Yield (bu/A)	95% Confidence Interval	Relative Maturity (days)	Value/Acre
Drummer	33.73 (40%)	0.84	DEKALB® - DKC66-96	263.6	+/- 39.76	116	\$ 875.15
Flanagan	23.96 (29%)	0.91	CROPLAN® - 5415	264.4	+/- 28.63	107	\$ 877.8
Raub	22.50 (27%)	0.83	PIONEER® - P1311	258.1	+/- 66.33	113	\$ 856.89
Clare	1.75 (2%)	0.91	DEKALB® - DKC62-08	242.0	+/- 94.57	112	\$ 803.44
Dana	1.49 (2%)	0.87	CROPLAN® - 6265	264.3	+/- 37.40	112	\$ 877.47
Total: 83.43 (100%)		Avg. 0.86		Avg. 262.0			Avg: \$869.83

Top Performers East Field's Soils

<input checked="" type="checkbox"/> Drummer	FBN Avg. Yield (bu/A)	<input checked="" type="checkbox"/> Flanagan	FBN Avg. Yield (bu/A)	<input checked="" type="checkbox"/> Raub	FBN Avg. Yield (bu/A)	<input checked="" type="checkbox"/> Clare	FBN Avg. Yield (bu/A)
1. DKC66-96 - DEK	263.6	1. 5415 - CROPLA	264.4	1. P1311 - PIONEER	258.1	1. DKC62-08 - DEK	242.0

Source: Farmers Business Network Website, Market Research



Founded in 2007, XAG is an drone / UAV spray and sensing manufacturer and service provider.

Provides various solutions –hardware, drone spray applications through partners, academy training on agronomy and drone piloting, and various crop insights through remote sensing

Key Points:

- #2 Drone Spray service provider in China
- Holistic agronomy solutions

An aerial photograph showing a dark-colored car driving on a light-colored dirt road that winds through a vast, open landscape. The terrain is covered with low-lying green and brown vegetation. In the background, there are rolling hills and a clear blue sky.

XAIRCRAFT




P30

PLANT PROTECTION UAS

P30en.mp4



Competencies of various Smart Sprayer technologies

Company	Tech used	Technology method	Tech specifications	On-farm problem being solved	Estimated farm-level investment on technology	Launch Year
	Camera on sprayer	<ul style="list-style-type: none"> Identifies green areas, maps it, correlates green = weed patch; Night spraying feasible 	Not crop specific	Herbicide optimization (mostly in pre-burndown application)	From Croplands Australia - PhantomDrive system retails Weedit Kit: Eur 80.000 (+GST)	In-market in Australia, Argentina, Brazil, Canada, Russia; USA
	Camera on sprayer	<ul style="list-style-type: none"> Identifies crop vs' weeds; weed in between planting rows Ink jet nozzles allowing centimeters of accuracy with 0 drift 	<p>Tested in lettuce and cotton (0-12 inches)</p> <p>Speed: 6-8 mph</p>	Herbicide optimization	-	Estimated in 2019
	Camera on sprayer	<ul style="list-style-type: none"> Identifies crop vs' weeds; mixes individual nozzle prep Has pre-mixing unit in entire spray system 	Not crop specific	Crop Protection optimization	-	Estimated in 2019 +

Source: Market Research

**Nick Dubuc**

@NDubuc

Agricultural engineer (jr) + part-time farmer + advocate + CTF enthusiast. Tweets are my own.

SW Quebec

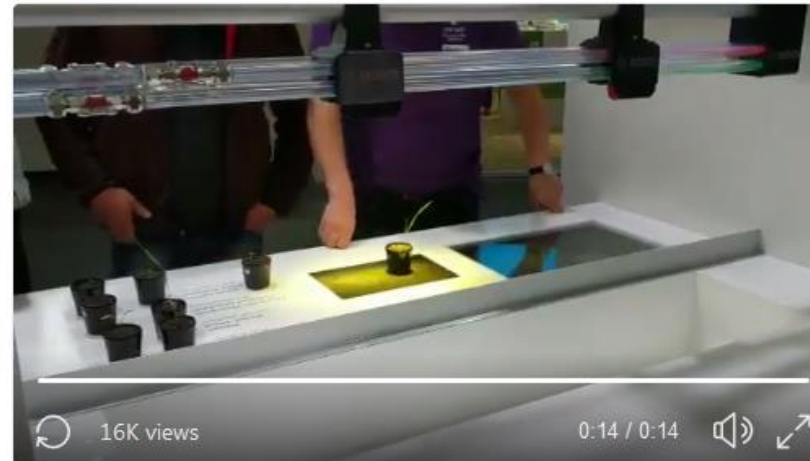
Joined September 2010

**Nick Dubuc**

@NDubuc

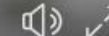
Follow

Bosch / Bayer xarvio Smart Sprayer.
Detects which weed specie is present
and selects herbicide accordingly.
Available 2021 #agritechnica



16K views

0:14 / 0:14



2:30 PM - 14 Nov 2017

139 Retweets **232** Likes

T-Tech



9



139



232

**Nick Dubuc** @NDubuc · 14 Nov 2017

<https://twitter.com/ndubuc/status/930563719813312512?lang=en>



Bayer's driving principles in the area of Digital Farming

Bayer's Know-how

Leverage our experience and expertise in **Agronomy in Seeds and Crop Protection**

Connect this expertise with Digital technologies to **solve** broader on-farm **problems**

Commitment

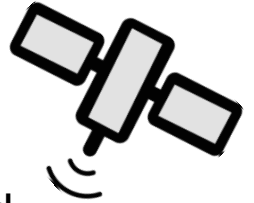
Collaborations in the development of digital solutions **to create innovative solutions** and technologies together with existing experts



Motivation

Make agriculture more sustainable and **efficient**.

Support farmers to meet increasing challenges.



Focus so far

Optimization of crop protection, with measurable results and clear value at farm level



Summary

- // Digital Farming is about solving an on-farm problem
- // Different solutions are already used in real life fields across the world
- // Start developing digital products **WITH** your farmers, not for your farmers