

# Smarter soybean production through Dutch and Brazilian technology and know-how integration

SMP 2020 evaluation – Block Latin America

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# Project proposal available, TKI subsidy granted

- The objective of this four-year project is to develop, integrate and validate knowledge and technologies for more sustainable, circular and climate-smart soybean production on arable farms
  - Weed control (sensing en actuation)
  - Air-borne disease control (DSS)
  - Soil-born disease control (sensing, DSS, (bio-)control)
  - Smart re-use of data (interoperability, crop growth models)
- The R&D in the project will be done by a Brazilian-Dutch/EU consortium of 12 partners
- We are in CA phase

<b>Partners</b>	<b>Expertise</b>
Rometron	Sensors and precision ag technology
Syngenta	Crop health and protection
Stara	Smart machines company (soy, corn)
Oro Agri	Green crop protection products
GDM Seeds	Soy varieties
Bioscope	Remote sensing
Hiber	Connectivity
Fundacao	Public Brazil R&D Institute
Embrapa	Public Brazil R&D Institute
UFSC	Brazil University
WPR	Dutch R&D Institute
Dutch embassy Brazil	Liaison

# Company: Rometron (Netherlands)

- 20 years experience in chlorophyll detection, 10 years in agriculture
- 30 employees, most highly educated.
- In house production in Netherlands, latest automotive standards, high quality facility
- OEM cooperation: Stara, Croplands
- > 1000 systems operational worldwide
- N-Z America, Oceania, Asia, Europe



# Product: WEED-IT Quadro (5<sup>th</sup> generation)

- Fast (25-30 km/h), robust, precision (1 cm<sup>2</sup>), high savings (60-90%), ROI in 2 years!
- Chlorophyll fluorescence:
- 4 detection channels (4x25 cm)
- High precision chlorophyll (biomass) scanner (25x25cm)!



# Features: WEED-IT Quadro

- High precision variable rate control per 25 x 25cm
- Integrated PWM: frequency dep. on speed and rate
  - PWM rate control, durable, chemical resistant
  - High: precision, frequency, flow range



# Techniques: Smart weed control

- Green on brown: Detects weeds on stubble
  - Modes: Spot, Dual, Full Coverage (in crop PWM)
- **In development:**
  - Green on Green: Detects weeds in an emerging crop
    - Plant size based (static) or adaptive crop (dynamic)
  - Biomass depending spraying
    - Spraying according to actual chlorophyll activity
      - Crop spraying before harvest
  - Weed mapping: Record and Playback

# WEED-IT IoT module

- Mapping of crop biomass, spray activity (25x25cm)
- Apply VRA maps in (25x25cm)
- System logging, diagnostics, remote support

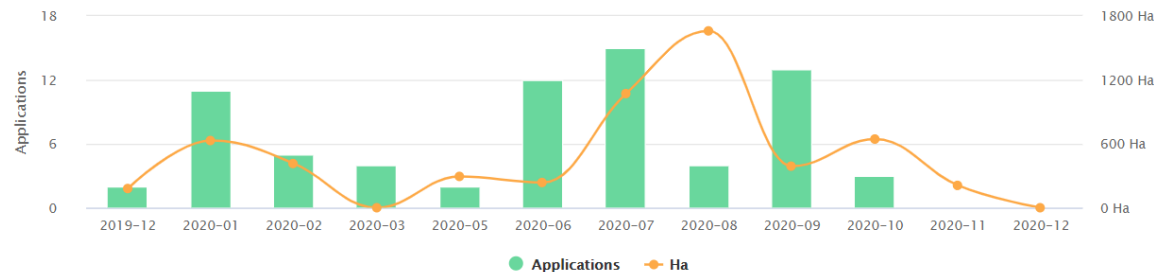


# Farmer: economical benefit

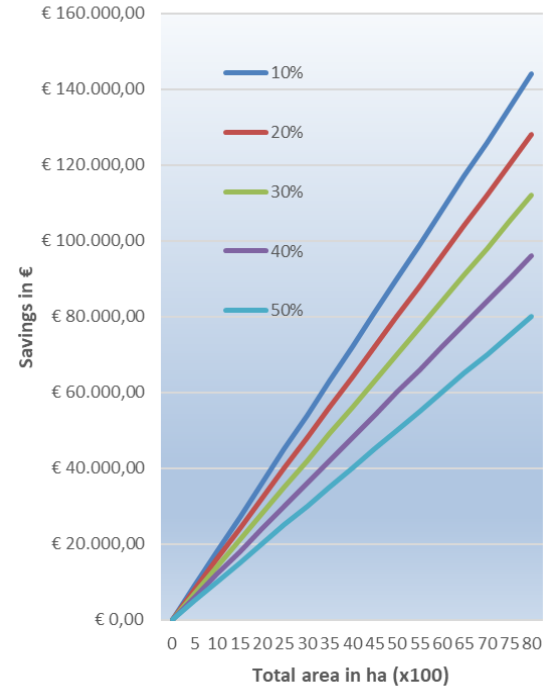
*"As farmer I want to save herbicides (money)"*

- How much did I apply/save in this spray job?
- Save: Australia 85-95%, N-America: 75-90%

Applications/Hectares made per Month



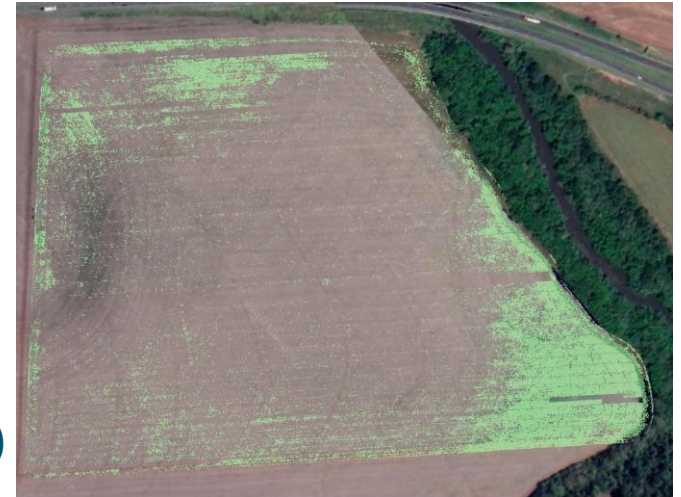
Savings in different weed occupation using WEEDit at Herbicide cost of € 20,00 per hectare



# Farmer: decision support (to develop)

*"As a farmer I want to have better insight in weed hearths of my field"*

- Better decision support
- Increased monitoring
- Biomass recording per channel
  - Low resolution (5 Hz)
  - High resolution (30 Hz, 25x25 cm)



# Test result: Green on Green in Mato Grosso (Bra)

- Plant level based 'Green on Green'
- In cotton: (01-03-2020)
  - 1200 ha cotton
  - Herbicide: Clethodim (21,1 € /ha)
  - Savings: 17395 euro (14,4 € /ha)
- 'Green on green' in soybean is harder as there is more biomass.
  - **Smarter technique needed, and should be validated!**



# Farmer: green on green (to refine)

*"As a farmer I want to apply on weeds that are hard to control more than one time"*

For example: capim-amargoso in cotton

## ■ Treatments:

- Green on Green (first spray cycle)
- Weed mapping: record and playback (second spray cycle)



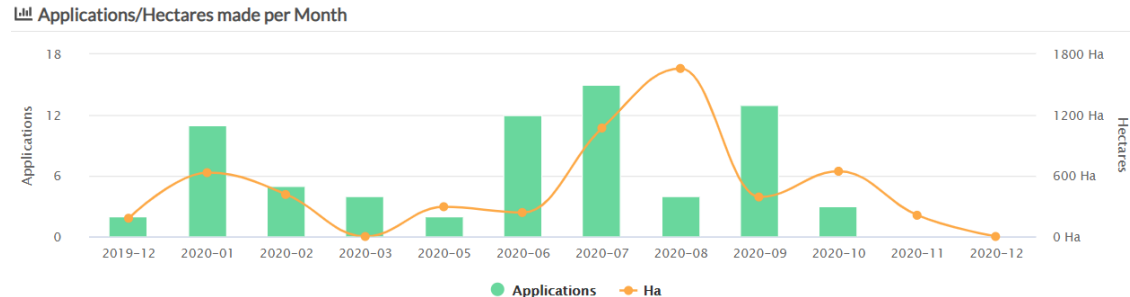
# Governmental and environmental benefits

- Savings of resources, environment, sustainable land-use
- Economical benefits
- Integrated Pest Management through increased monitoring

Dist	Has	Width	Avg Vel	Vel M	Hum	Temp	Pres	Wind
km	ha	m	km/h	km/h	%	°C	bar	km/h
28,60	37,44	32,39	23,28	63,00	48,90	15,01	1,95	16,61
38,46	10,23	26,74	27,03	61,00	84,28	8,81	1,40	12,21
21,88	34,37	30,70	22,32	54,00	73,79	12,42	1,63	14,91
25,33	50,15	31,94	23,38	63,00	62,09	14,76	1,80	17,04
37,90	36,31	32,39	23,84	63,00	48,20	15,87	1,63	12,01
34,32	27,92	33,07	29,88	61,00	77,59	10,44	2,50	12,21

# Benefits for Rometron

- Better monitoring, better support (online, remote)
- Less travel expenses (remote area's hard to travel): Lower CO2 footprint
- Benchmarks over crops, treatments, region's
- BI: Business intelligence, KPI's, dashboards:
- AI: Artificial intelligence, data integration



# Obrigado!

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