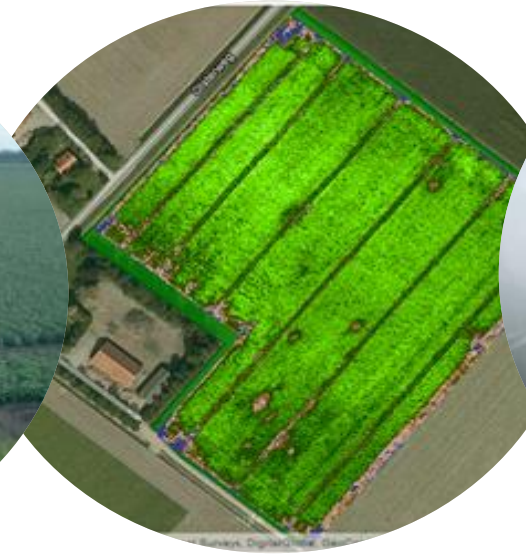


How can digital and precision technologies contribute to a more sustainable agriculture ?

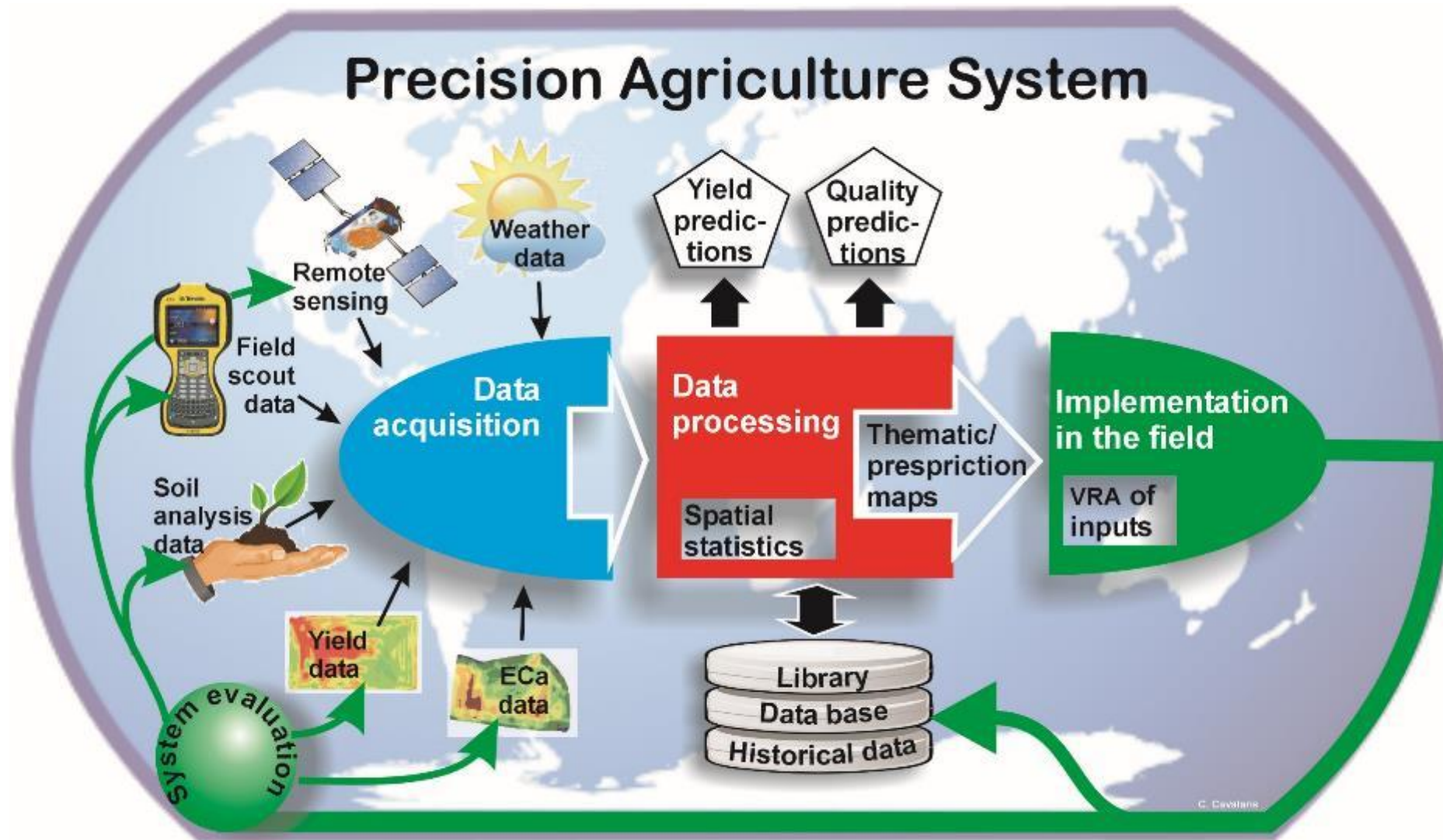
Corné Kempenaar

Sustainable solutions to protect crops Conference - 9-11 March 2021



Why precision agriculture / smart farming ?





- Right time
- Right place
- Right input
- Right amount

Precisie agriculture / smart farming is a growth model

- PA 1.0, since 1990, GNSS (GPS), digital crop recording systems (FMIS), DSS, climate sensors
- PA 2.0, since 2010, satellite and drone images, GIS data-platforms, sensors, variable rate applications
- PA 3.0, pioneer phase, field robots plus applications (sense-decide-act on the go)
- PA 4.0, pioneer phase, interoperability!, data sharing and smart use for strategic decision on farms and in agri-food chains



Requirements for smart farming

- Farm management information system
 - Data platform
- GNSS on the farm
- Sensor data: e.g. crop, soil, weather, etc.
- Decision support
- Machines prepared for VRA
 - More and more automation and robotization



Precisie agriculture / smart farming data-platforms

Big + Small
AgTech providers

Big Food Companies

**1. Business
Decision-Making**

**2. Food
Integrity**

**5. Farmer's
Platform?**

**3. Public
decision-
making**

**4. Science
& Technology**

Public
Administrations

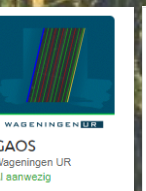
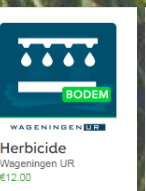
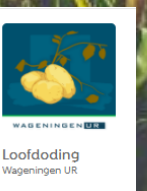
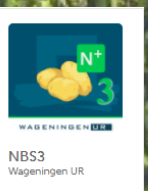
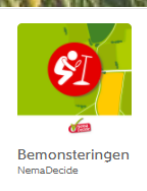
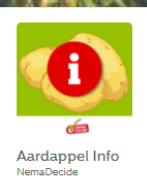
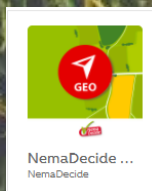
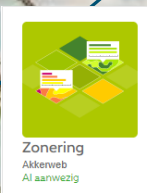
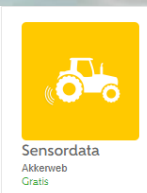
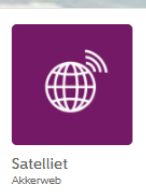
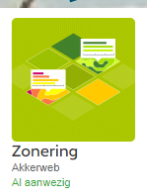
Research
Organizations

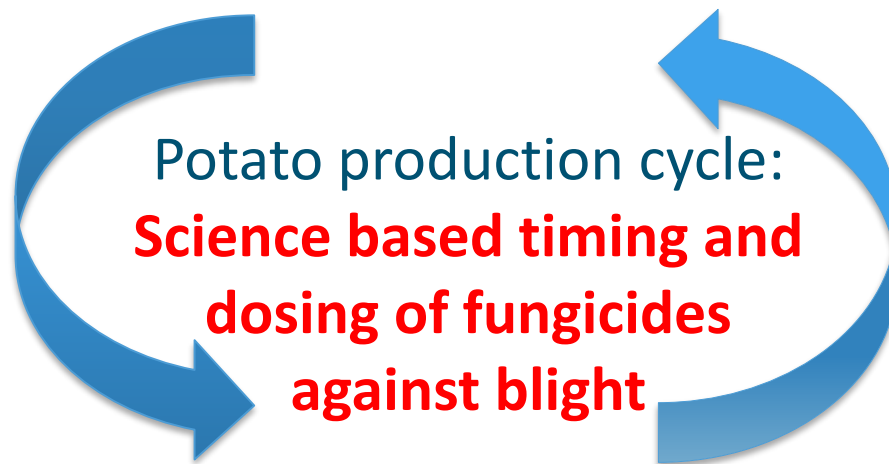


From data in the Cloud

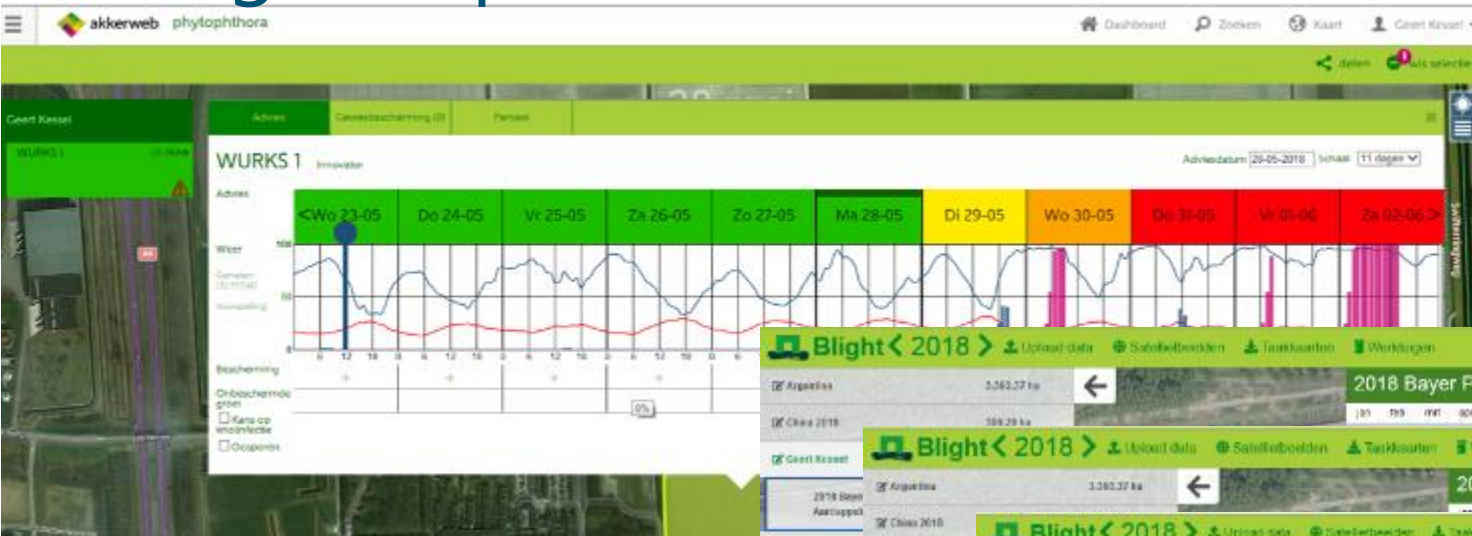
Akkerweb is an independent service platform for data use in (precision)agriculture and agrifood chains

To application in the field





Timing and variable rate application of fungicides against Blight in potato



Informatie

Opp. perceel: 8.45 ha.

Middel: Revus

Gemiddelde dosering: 0,45

Maximaal advies:

0.600000023841858 liter/ha

Concentratie: 0%

Minimum: 269 liter/ha

Maximum: 300 liter/ha

Gemiddelde: 279.9 liter/ha

Totaal watergebruik: 2290 liter

Regulier verbruik: 5.07 liter

Variabel verbruik: 3.82 liter

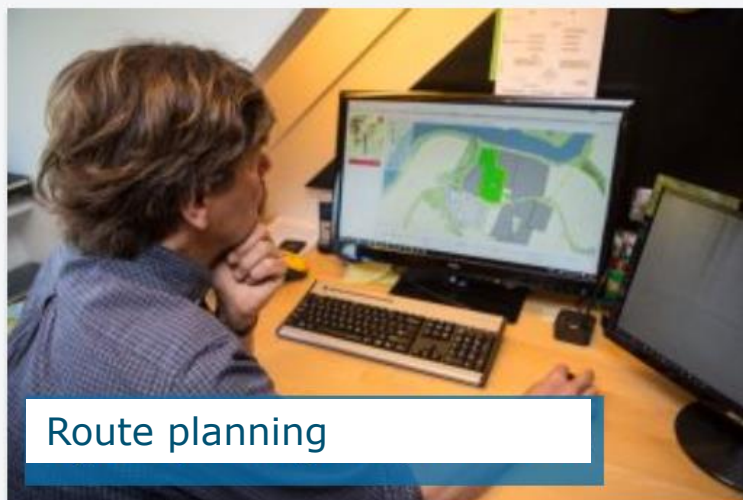
Besparing: 24.65%

PA 2.0 Applications in NL arable farming (NPPL 2018,

www.proeftuinprecisielandbouw.nl)



PA applications in NL farming (NPPL 2019, www.proeftuinprecisielandbouw.nl)



PA applications in NL farming (NPPL 2020, www.proeftuinprecisielandbouw.nl)



Precision irrigation (2)



Precision crop protection orchard



Yield monitoring



Precision seeding in healthy soil



Strip farming

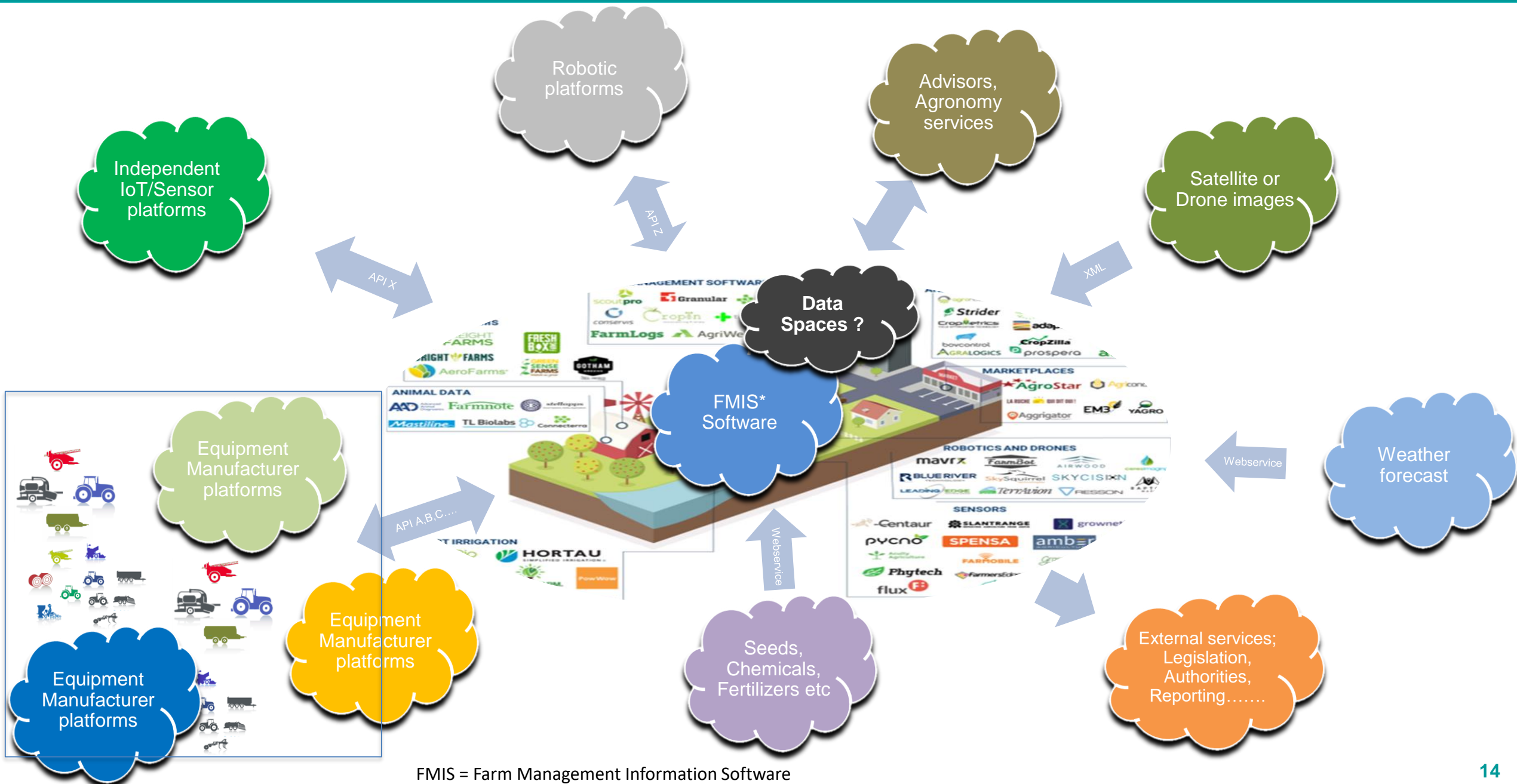


Robot applications

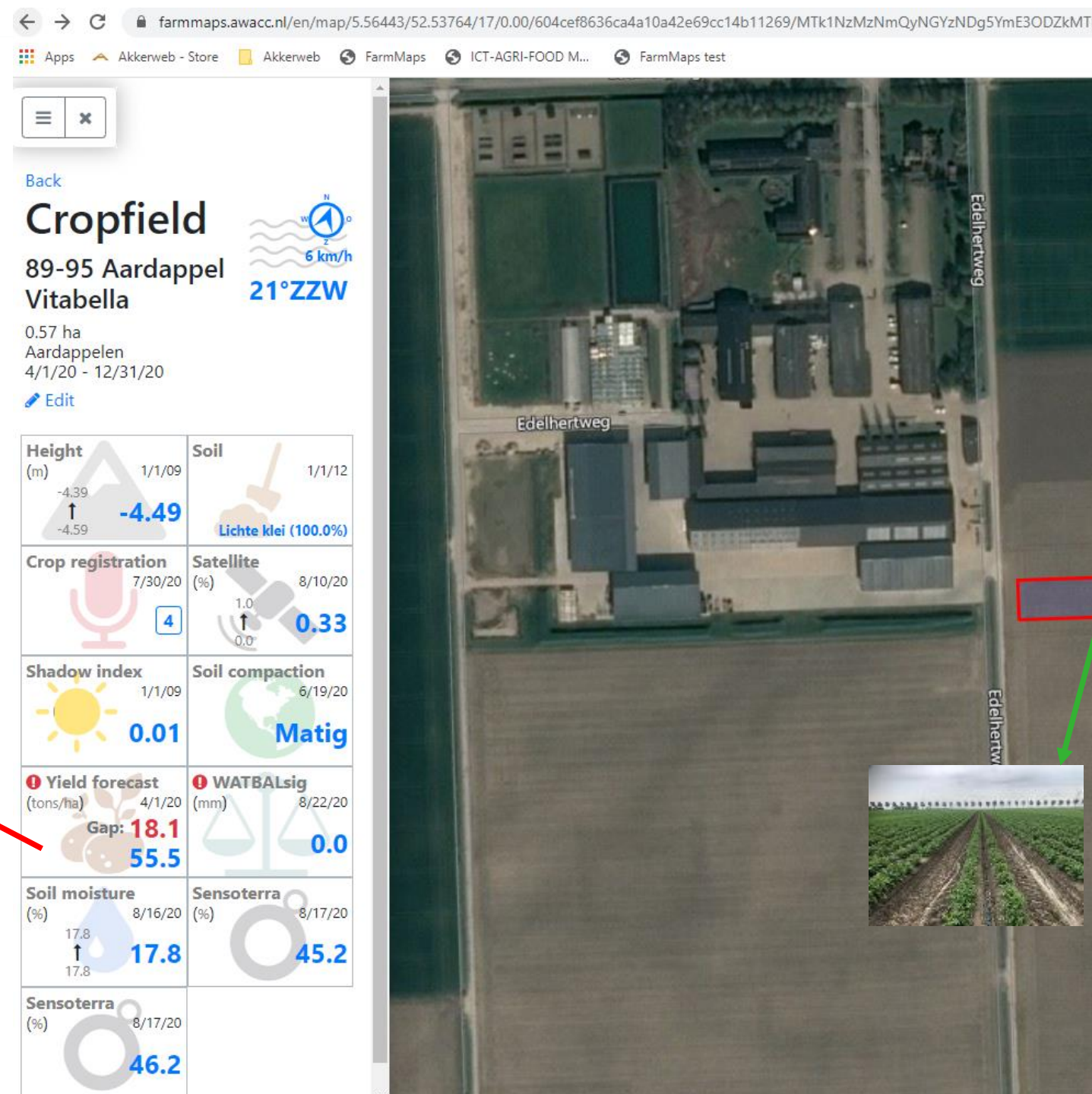
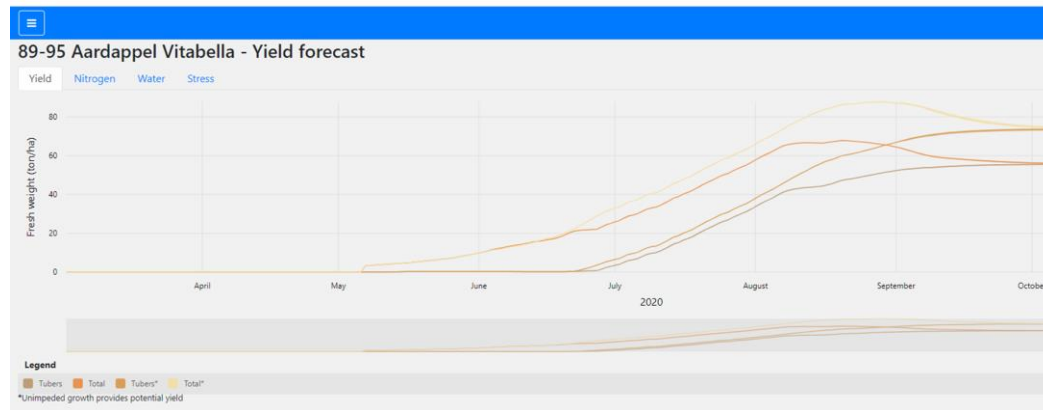
Robotic innovations (PA 3.0)

<https://www.wur.nl/en/Research-Results/Projects-and-programmes/Agro-Food-Robotics.htm>





PA 4.0 data space and dashboard Farm of the Future



More information

- Dashboard E-Pieper: <https://subsites.wur.nl/nl/show/Testsessie-E-pieper-Dashboard-levert-nuttige-feedback.htm>
- Dashboard GrasSignal: https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksinstututen/livestock-research/show-wlr/GrasSignaal-helpt-bij-voorspellen-van-hoeveelheid-en-kwaliteit-van-gras.htm?_ga=2.125138062.567665932.1610192220-1827042460.1541431547
- Smart Farming: <https://www.youtube.com/watch?v=z-dH8DBewrk>
- AgroFoodRobotics: <https://www.wur.nl/nl/Onderzoek-Resultaten/Projecten/Agro-Food-Robotics.htm>
- www.akkerweb.eu
- www.farmofthefuture.nl

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In conclusion

- Examples show that digitalization and precision technologies contribute to more sustainable farming and food production
 - Already 20-30 % reduction on inputs will yields remain the same or improve with PA 2.0 in NL.
- A mature farm data space is prerequisite to harvest the full potential of digital farming

Thank you for your attention

www.precisielandbouw.eu

<http://precisielandbouw-openteelten.nl/>

www.proeftuinprecisielandbouw.nl

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