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Federal Department of Economic Affairs,
Education and Research EAER

Agroscope

Smart Farming –
Higher efficiency for agriculture and environment

Thomas Anken, Agroscope
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www.agroscope.ch

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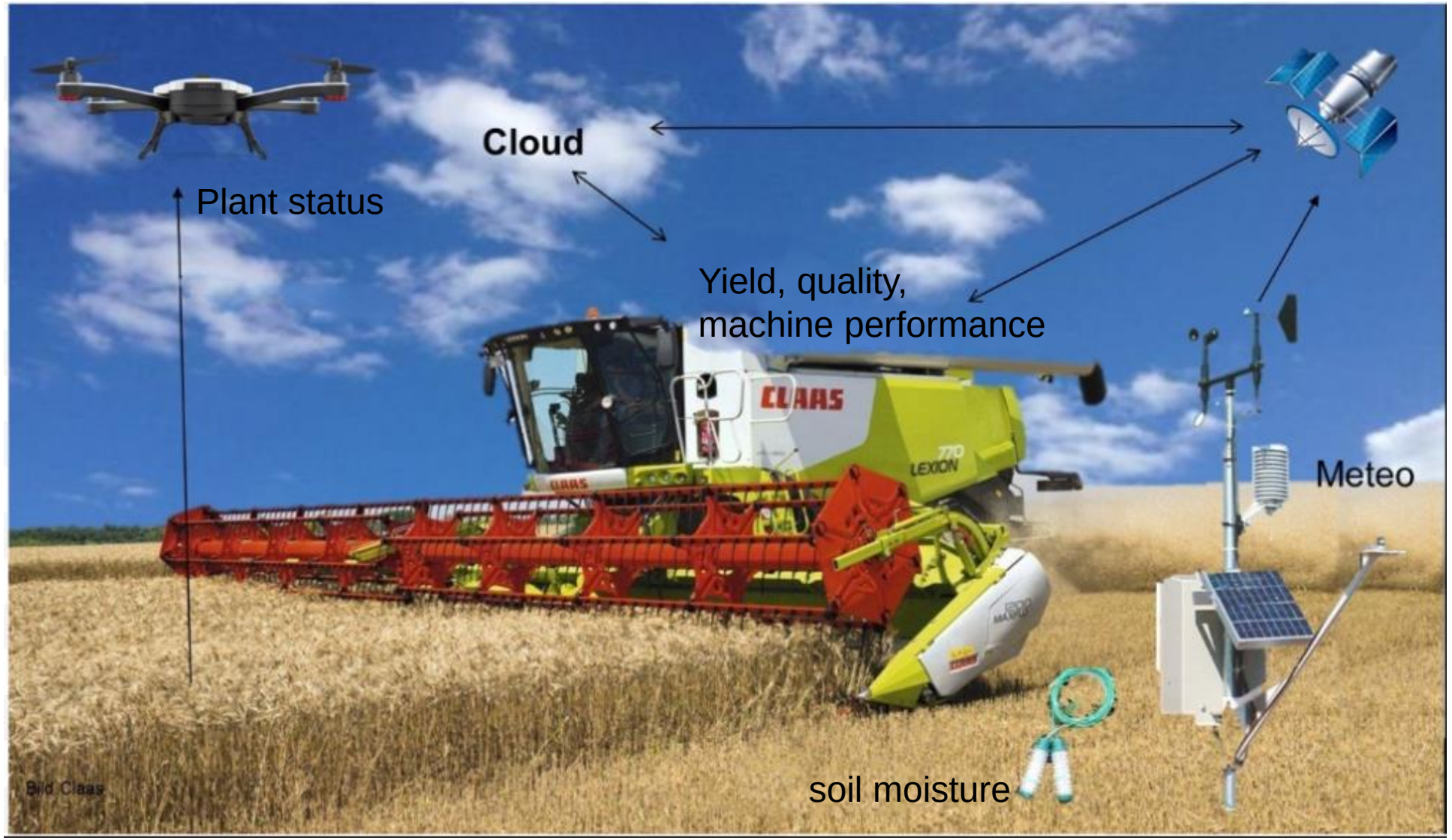
Connected agriculture is the future!



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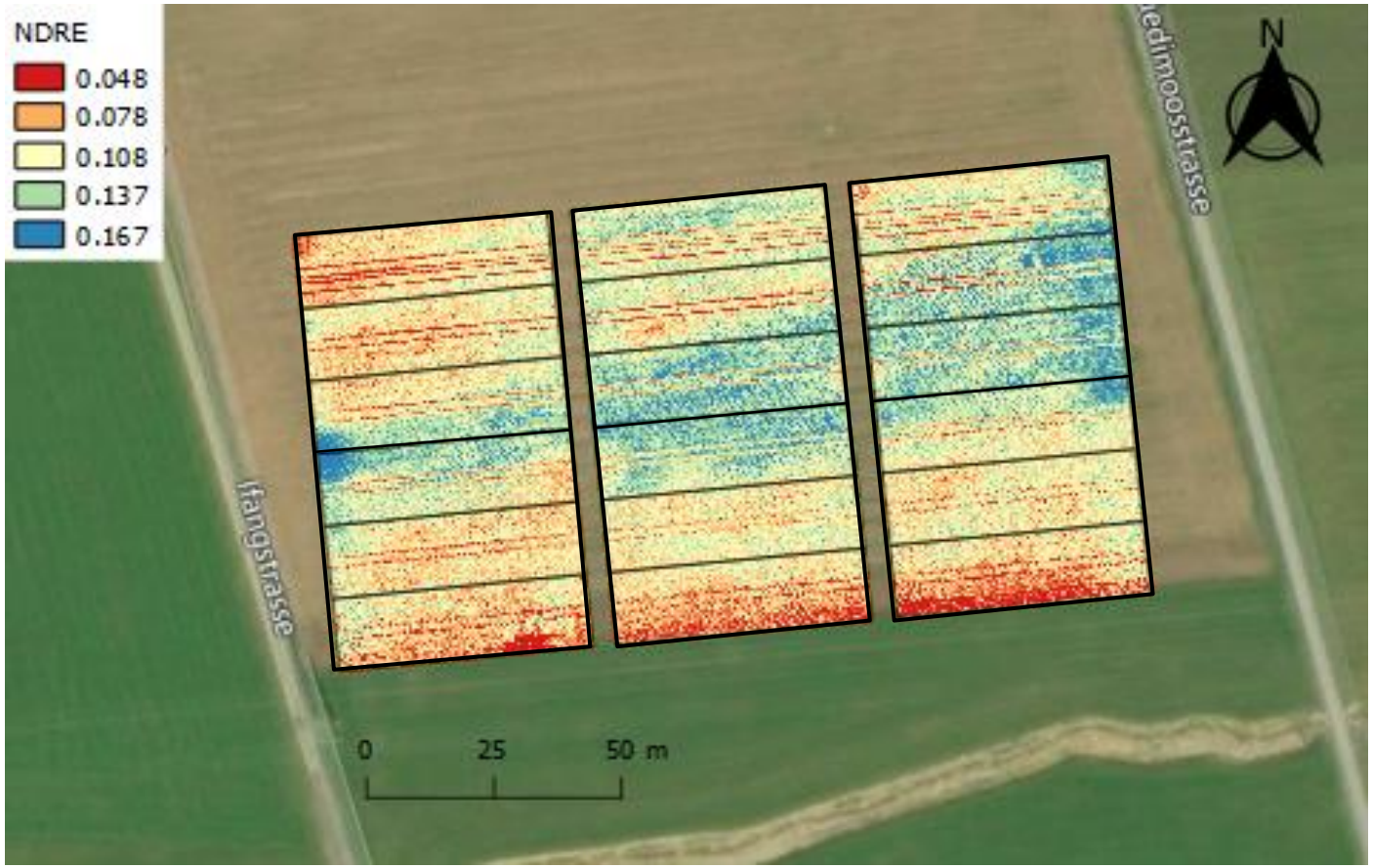
Multispectral image of a wheat field, Tänikon, 06.04.2018

Red-edge index (NDRE)



Connected drones ease data processing

Source: Francesco Argento

Adjusting the fertilization locally led to a decrease of 10 % of fertilizer.

Camera steered hoe reduces workload and of pesticides

Hoe with steering person

Row recognition action between crop rows

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Hoe with single plant recognition

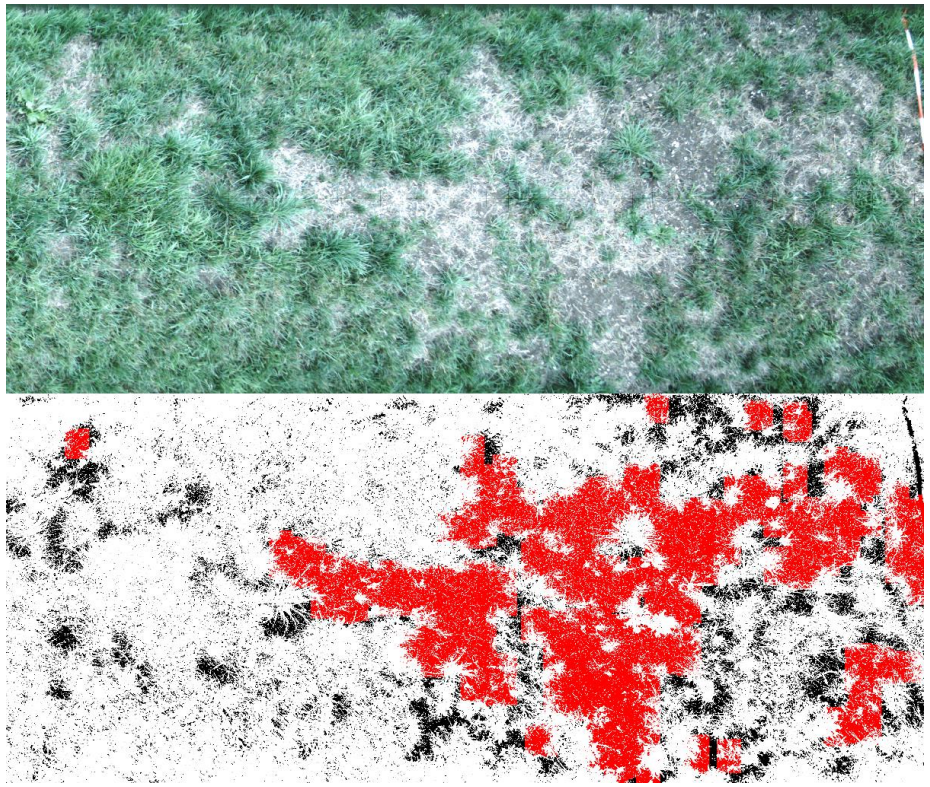
Plant specific treatment with fungicides and insecticides

camera recognizes salads:
→ only salads are sprayed
→ fungicide reduction up to 90 %

A common project of
Steketee, Möri Aarberg
Swiss Association of Vegetable Growers, Koppigen
Agroscope Tänikon & Wädenswil

Site specific overseeding of gaps in grassland

onboard computer



camera detects gaps –
seeding occurs only on red spots

Common project with:
Krummenacher, Dietwil; CSEM, Neuenburg; Agroscope, Tänikon

source: M. Sax

Autonomous vehicles

Single plant weeding saves over 80% herbicides

5G: Intelligence in the cloud instead on the vehicle?

www.ecorobotix.com

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Drones for treatments and data acquisition

Distribution of trichogramma wasps
Fenaco; HAFL; tueftelberger.ch

→ plant protection for the treatment of steep wineyards
→ In the same time drones can collect valuable information

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Connected trees: Internet of things driven irrigation

weather station

soil moisture

dendrometer
(stemm diameter)

flow meter

water savings of over 30 % have been realized in Switzerland and Brazil (cocoa)

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High automation of the milk production

→ over 800 milking robots in CH

→ better management of the whole process chain

automated feeding

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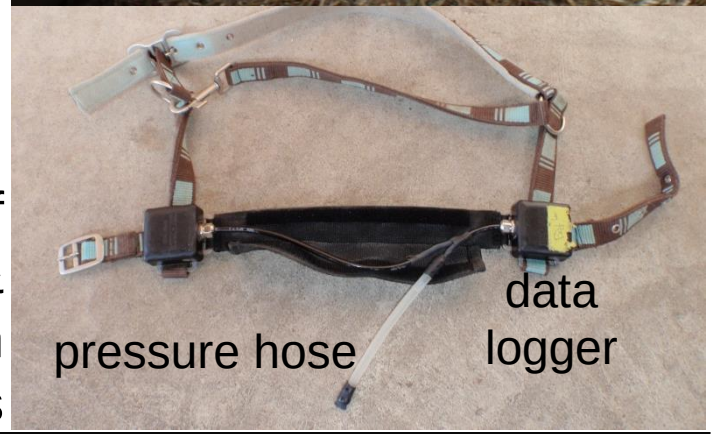
Monitoring health & feed intake

Sensor of Aotoso (CN) for heat detection
Narrowband-IoT eases
the use for the farmer

RumiWatch
by
Agroscope,
Itin & Hoch

Monitoring of
feeding &
rumination
frequencies



5G will enable data driven farming

- **Data to manage complexity:** Farming happens in complex environmental systems → better data and algorithms will allow to increase the productivity and to reduce environmental issues
- **Machine learning:** Recognition of weeds, pests, malnutrition of crops etc. are feasible by means of multi-spectral images and machine learning → many data intense applications will apear in the near future
- **Ease of handling:** The cloud will connect many different applications and ease the handling for the user. Maintenance of connected systems is becoming easier too.
- **Telemetry:** Machines will be fully connected and deliver all needed data
- **Connectivity:** Many farms don’t have optical fiber connection – 5G will bridge many gaps

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Thank you!
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