

SUCCESSFUL R&I IN EUROPE

Dusseldorf - February 15th Network Event

ALBERT SCHIRRING - BAYER AG - CROP SCIENCE DIVISION

February 15th 2019



PROJECT OBJECTIVES

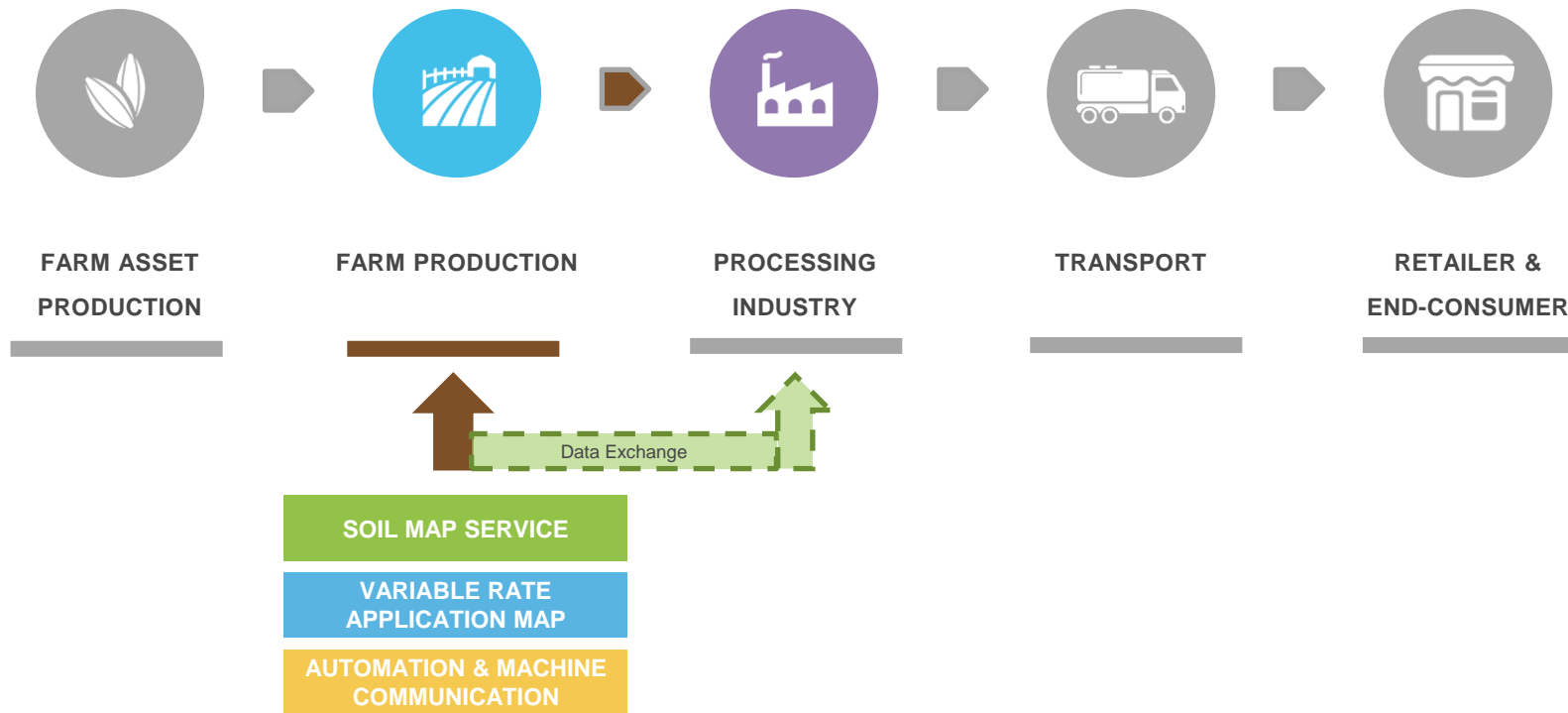
IoF2020 fosters a **large-scale uptake of IoT** in the European farming and food sector. In brief, it aims to:

1. Demonstrate the **business case of IoT** for a large number of application areas in farming and food sector;
2. **Integrate** and reuse available **IoT technologies** by exploiting open infrastructures and standards;
3. Ensure **user acceptability of IoT** solutions in farming and food sector by addressing user needs, including security, privacy and trust issues;
4. Ensure the **sustainability of IoT** solutions beyond the project by validating the related **business models** and setting up an **IoT ecosystem** for large scale uptake.



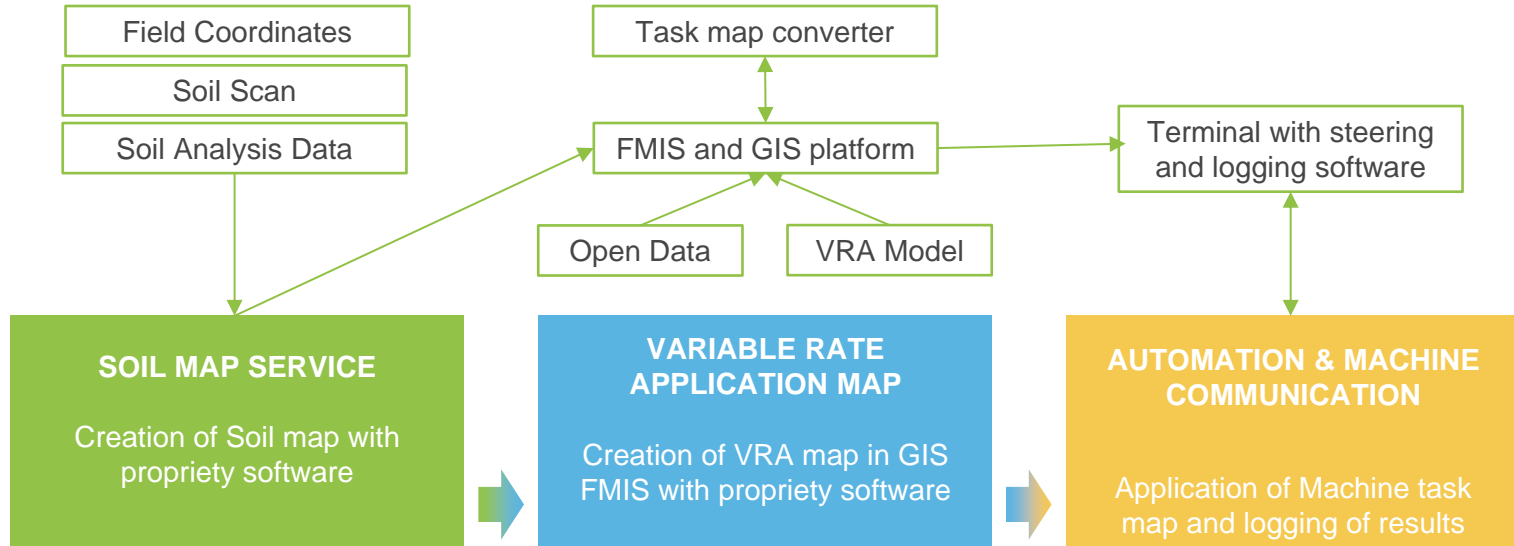
The Value Chain

Soil map based **variable rate applications**



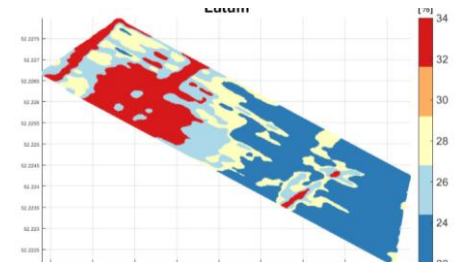
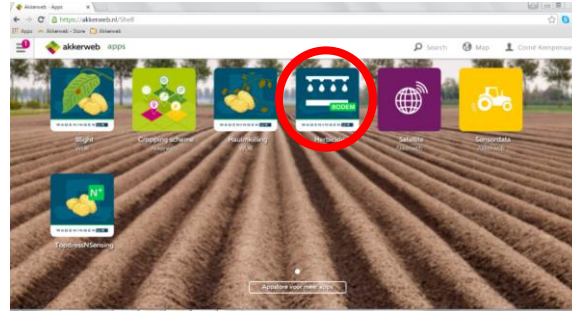
Product Functionality

High spatio-temporal **monitoring dashboard**

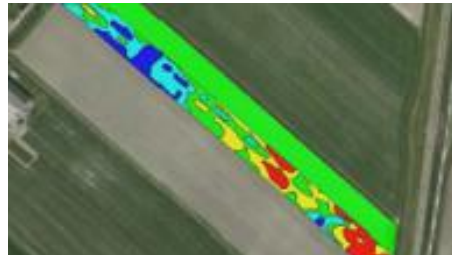


Product Impressions

High spatio-temporal **monitoring** dashboard



SOIL MAP SERVICE



VARIABLE RATE APPLICATION MAP



AUTOMATION & MACHINE COMMUNICATION

Product Factsheet

High spatio-temporal **monitoring dashboard**

Soil Map Service

Advance soil mapping

Customer & Provider



Farmers and advisors



Price per unit, added value

LoonwerkGPS,
soil analysis
labs, FMIS
providers



Major Challenge

Existing soil maps are not very user friendly and lack a certain level of precision in mapping relevant variability.

Core Product Features

Uses agronomic knowledge to create map of soil characteristics like organic matter or clay content, water storage capacity, etc..



Electro-magnetic sensor data analysis –

Measurement of soil structure, texture, mineral composition and organic matter with scan technology.



Soil sampling and Chemical analysis –

Smart soil sampling and soil analysis on organic matter and clay content, nutrients, pH-level, etc.)

Here is what we aim to improve (KPIs)

Higher Forecast Precision  -5%

Higher Resolution of Soil Map  +5%

Accurate forecast of soil variability will lead to use of soil maps in precision crop management. Soil map service should be cost-effective at the farm level.

Product Factsheet

High spatio-temporal **monitoring dashboard**

Variable Rate Application Map Service

Smart application of resources: seeds, pesticides, fertilizers

Customer & Provider



Farmers and advisors



Price per unit, added value

LoonwerkGPS,
soil analysis
labs, FMIS
providers



Major Challenge

Existing variable rate maps are often based on tweaking expert judgement and lack a certain level of precision in tasking / lack of validation.

Core Product Features

Uses soil maps and agronomic knowledge to create crop management task map based on variability in soil characteristics like organic matter and/or clay content, water storage capacity, tramlines, shade, etc..



Variable planting distance map – Validation in 2017 and 2018. Nov. 2018 portal where maps can be ordered.



Variable rate herbicide use map - Validation in 2016 and 2017. May 2018 portal where maps can be ordered.



VRA additional N spraying
June 2018 on Growth + Soil Maps.

Here is what we aim to improve (KPIs)

Yield by better plant distribution  +4%

Quality by better plant distribution  +5%

Reduction pesticide use  -23%

Reduction fertilizer use  -10%

Better distribution of plants leads to +5% kilos and +5% better quality (more potatoes in desired size). Taking soil characteristics for weed growth into account: -23% less herbicide and +2% more yield.

Enriching canopy index with soil characteristics lead to -10% less additional N fertilizer (2nd phase).

These values derive from comparison of a standard farm's performance prior to the installation of our system and after.

Product Factsheet

High spatio-temporal **monitoring dashboard**

Automation & Machine Communication

Automatic translation of VRA maps into machine tasks

Customer & Provider



Farmers and advisors



Price per unit, added value

LoonwerkGPS,
soil analysis
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providers



Major Challenge

Last mile hurdle: automatic translation of crop management task into machine task map plus logging of as applied map for use in next crop management decisions

Core Product Features

Machine software for managing data on machines in a standardized way, allowing precise machine steering and variable rate logging



Precise task map translators on planter, spreader and sprayer software - machine software, flow prepared with handwork. Test in 2018



Machine interfaces - flow prepared with handwork. Interaction with UC 1.4

Here is what we aim to improve (KPIs)

Time Reduction  -5%

Higher application precision  +5%

Comfort  +5%

KPI's are based on expert judgement. We also predict better crop management decisions later on.

Product User Story

High spatio-temporal **monitoring dashboard**

Without our Product or Service



Standard plant distance

Could be better with more seed potatoes along tramlines and high lutum, less plants in shade



Standard soil herbicide application

Less herbicide could be used in zones with lower lutum and organic matter content.



Standard additional N spraying

Could be more effective when related to canopy and soil.

With our Product or Service



Variable potato planting on sprayer tramlines, shade and lutum (clay).

Variable planting based on NL tree database, tramline plan and soil map.



Variable soil herbicide application

23% less soil herbicide realized, by lower application at lower levels of lutum and organic matter, plus higher yield.



Better N advice with soil map

Canopy index advice can be improved on subparcels with high growth capacity.

Here is the difference

Homogenous crop and product



Less herbicide use, better product



More effective use N

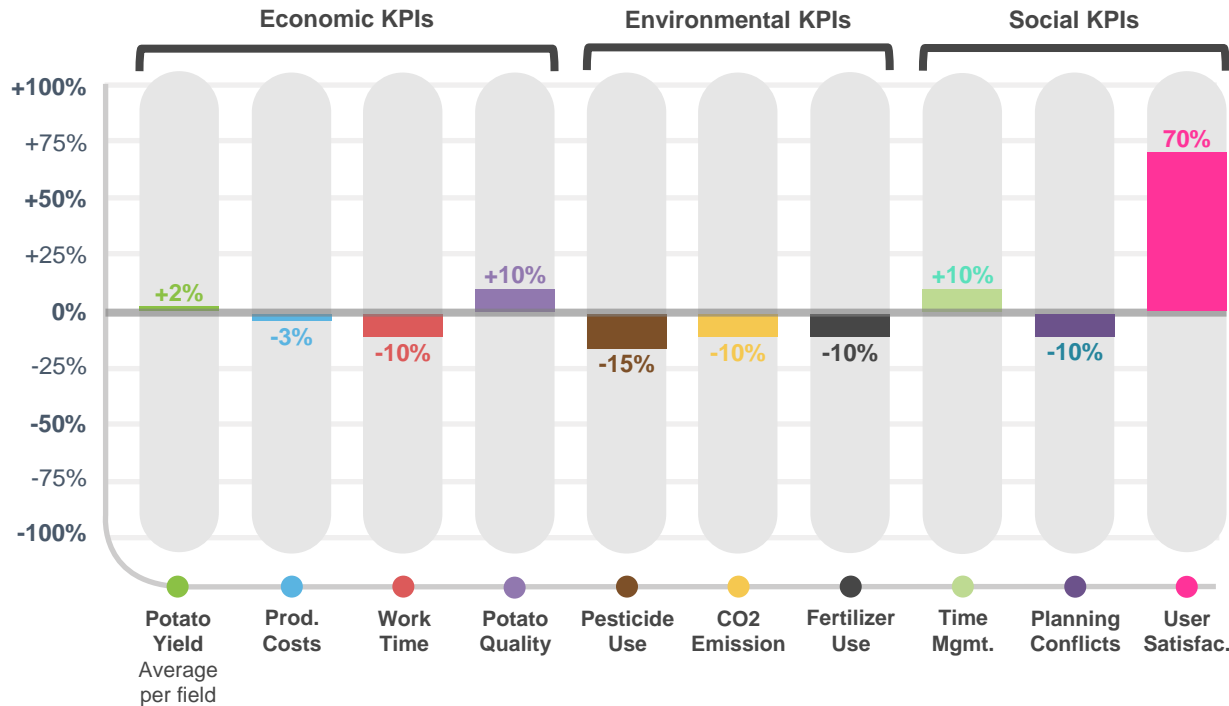


Target User – Small to medium size farms (50– 200ha)

- Less production costs
- Less adverse side effects
- Higher yield and quality

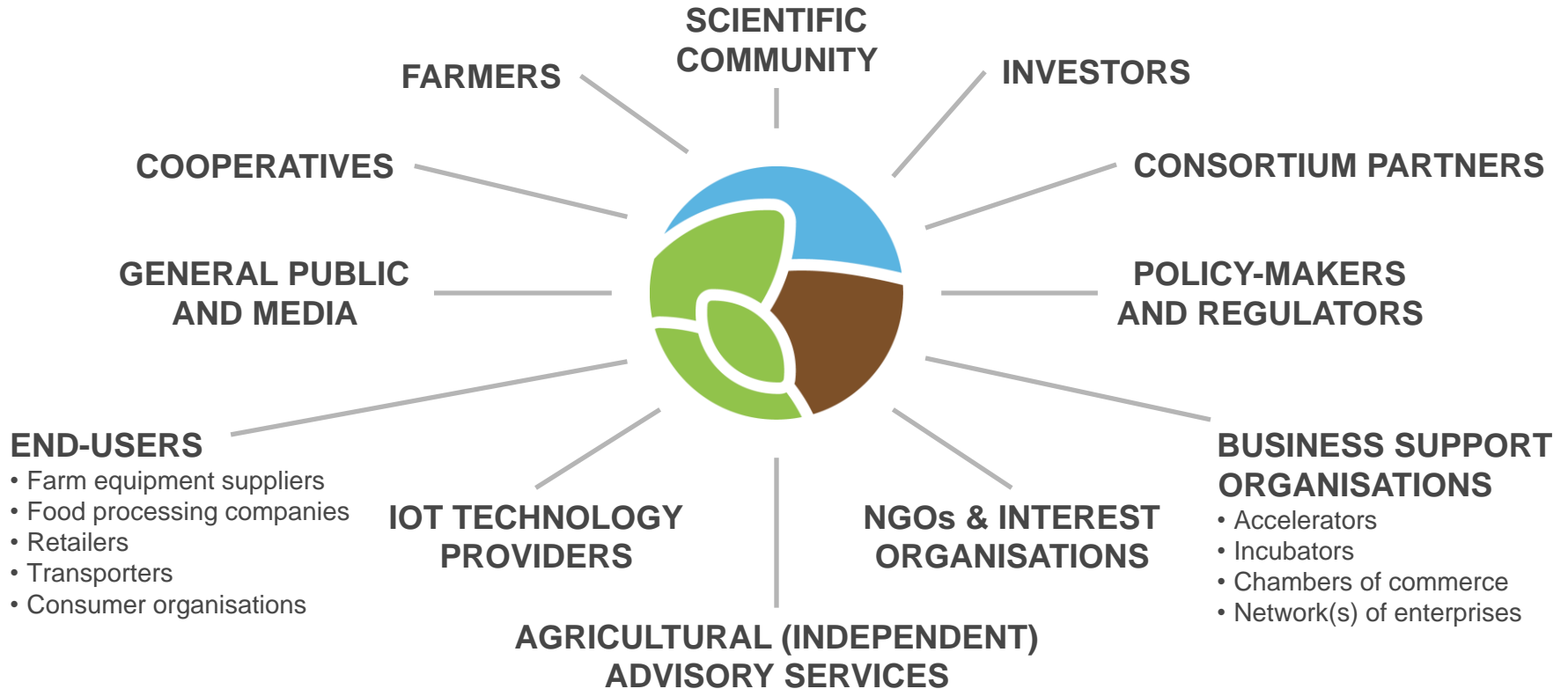


USE CASE KPI MEASUREMENT



- Average Potato Harvest per field**
Yield sensor provide yield map of objects
- Production Costs per ton**
Costs for assets like fertilizer, water, worker etc
- Work Time Invested**
Registration operation time hours/tons/day
- Potato Quality**
NIRS, vision, not in year 1
- Pesticide Use and Emissions**
Pesticides used per ha
- CO2 Equivalents Emissions**
- Fertilizer Use and Emissions**
expressed in kg N, P or K per ha
- Time Management**
Higher flexibility, better work-life-balance
- Planning Conflicts**
Less colliding tasks by better predictions
- User Satisfaction**
Overall satisfaction of end-user with product

TOWARDS THE IOF2020 ECOSYSTEM



THANK YOU FOR YOUR ATTENTION!

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