System-to-System Data Collection in business surveys applied to an agricultural survey: a Proof of Concept

2022 UNECE Expert Meeting on Statistical Data Collection 'Towards a New Normal?', 26-28 October 2022, ISTAT, Rome

Ger Snijkers, José Gómez Pérez, and Tim de Jong (Statistics Netherlands)
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General idea

7h1 Vaste mest: werkresultaat mesttoediening

Geef per werkresultaat het percentage vaste mest aan op bouwland en grasland.

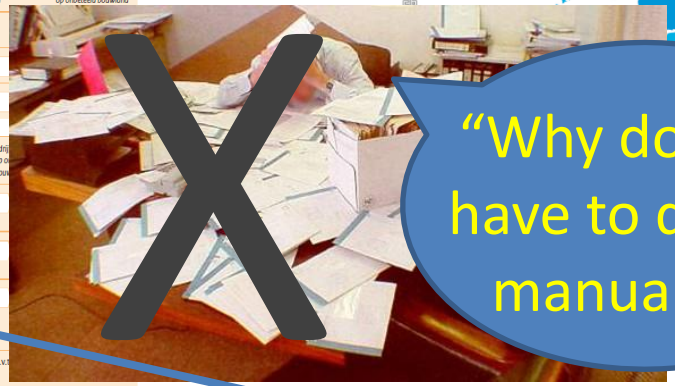
		% van totaal toegediende vaste mest op grasland	op onbeteeld bouwland
Bouwland	bovengronds toegediend, daarna ondergewerkt	n.v.t.	
Grasland en bouwland	mest ligt verdeeld over perceel na bovengronds toedienen		
Totaal			

7h2 Drijfmest: werkresultaat mesttoediening

Geef per werkresultaat het percentage drijfmest aan op bouwland en grasland.

		% van totaal toegediende drij op grasland	op o bouw
Bouwland	bouwlandinjecteur: d.m.v. injectietanden direct in de grond gebracht	n.v.t.	
	bovengronds: in een werkgang op de grond gebracht en ondergewerkt	n.v.t.	
Grasland en bouwland	de mest ligt verdeeld over het perceel zoals bij breedwerpig bovengronds toedienen of bij een machine ver boven de grond houden	1251	
Grasland	de mest ligt op de grond in strookjes zoals bij juist gebruik van een sleepvoetmachine of bij gebruik van een sleufkouter of zodenbemester die geen sleufje maakt of niet snijdt	1253	n.v.t.
Grasland	de mest ligt gedeeltelijk in sleufjes in de grond en gedeeltelijk op de grond zoals bij gebruik van een sleufkouter of bij ondiep werken met een zodenbemester	1254	n.v.t. n.v.t.
Grasland en bouwland	de mest is geheel in de grond gebracht in sleufjes zoals bij juist gebruik van een zodenbemester	1255	1256
Totaal		1258	1259
Welk deel (in %) van de drijfmest is via een sleepslang aangevoerd naar de bemester?		1261	1262

Pre fill



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4.4.1 Fosfaatproductie in dierlijke mest per landbouwgebied in 2016

kg fosfaat per ha
Minder dan 35
35 tot 65
65 tot 100
100 of 120
120 of meer

"Why do I still have to do this manually?"

Pre-filling: How to make this work?

Pilot with JOHN DEERE

Technoboer heeft de toekomst

Techno farmer has the future

Smart industries
Smart farming

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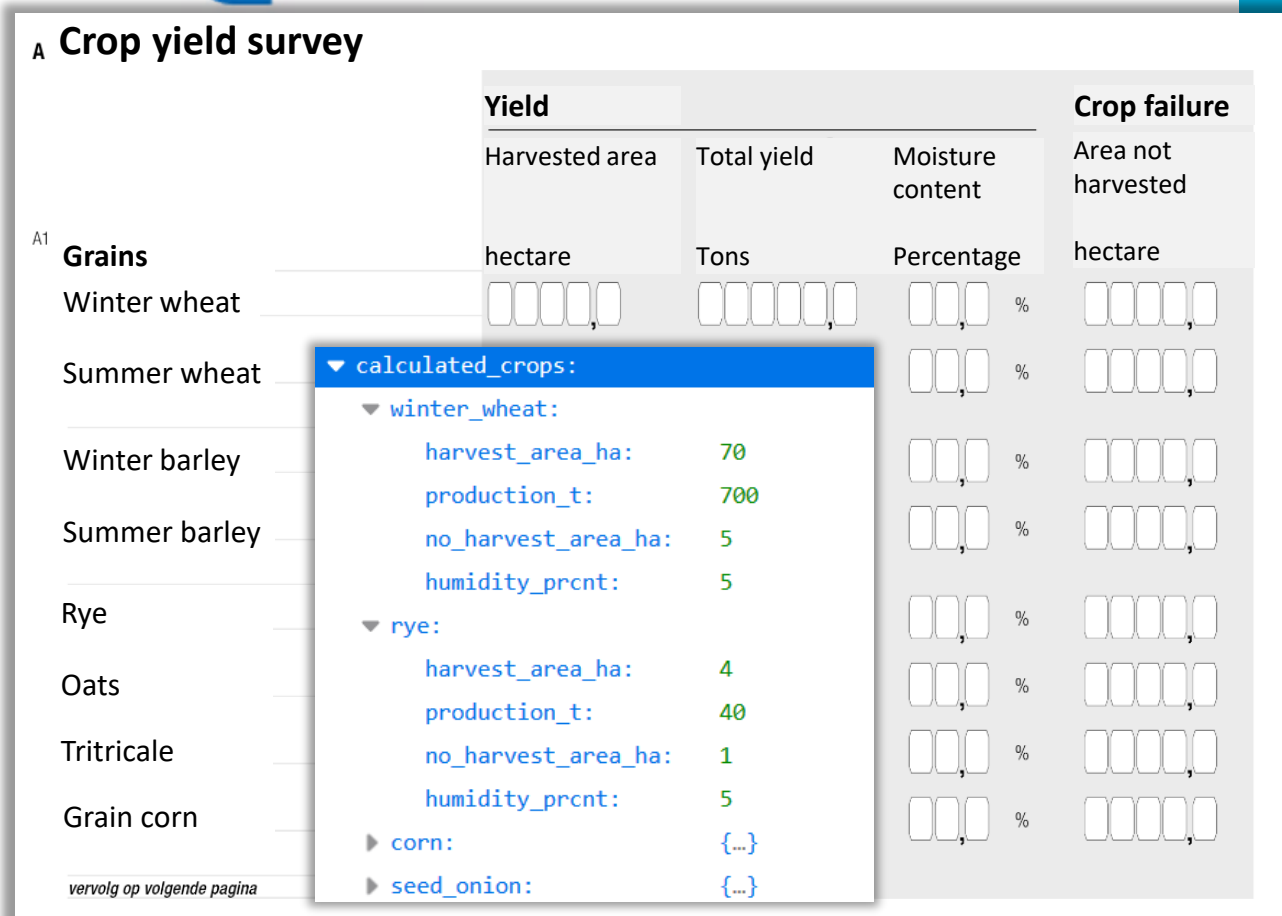
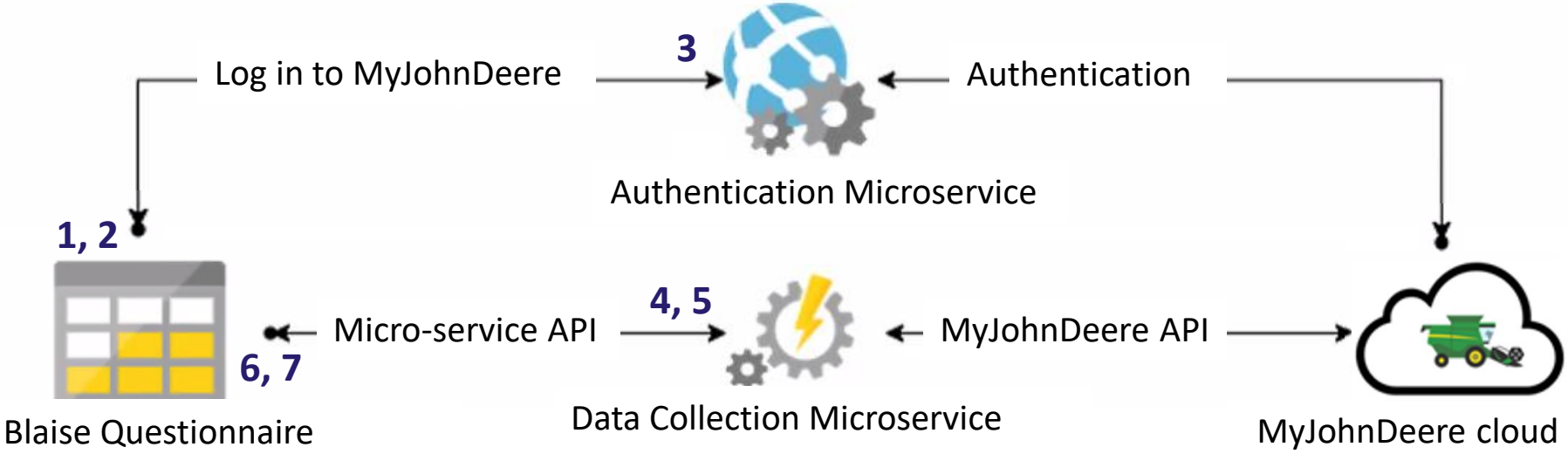
MyJohnDeere data

- Data: operations per fields
- Almost 100% overlap with data in questionnaire Crop Yield



System-to-system data communication



The farmer's completion process:

1. Comprehension
2. Data retrieval
3. Computation

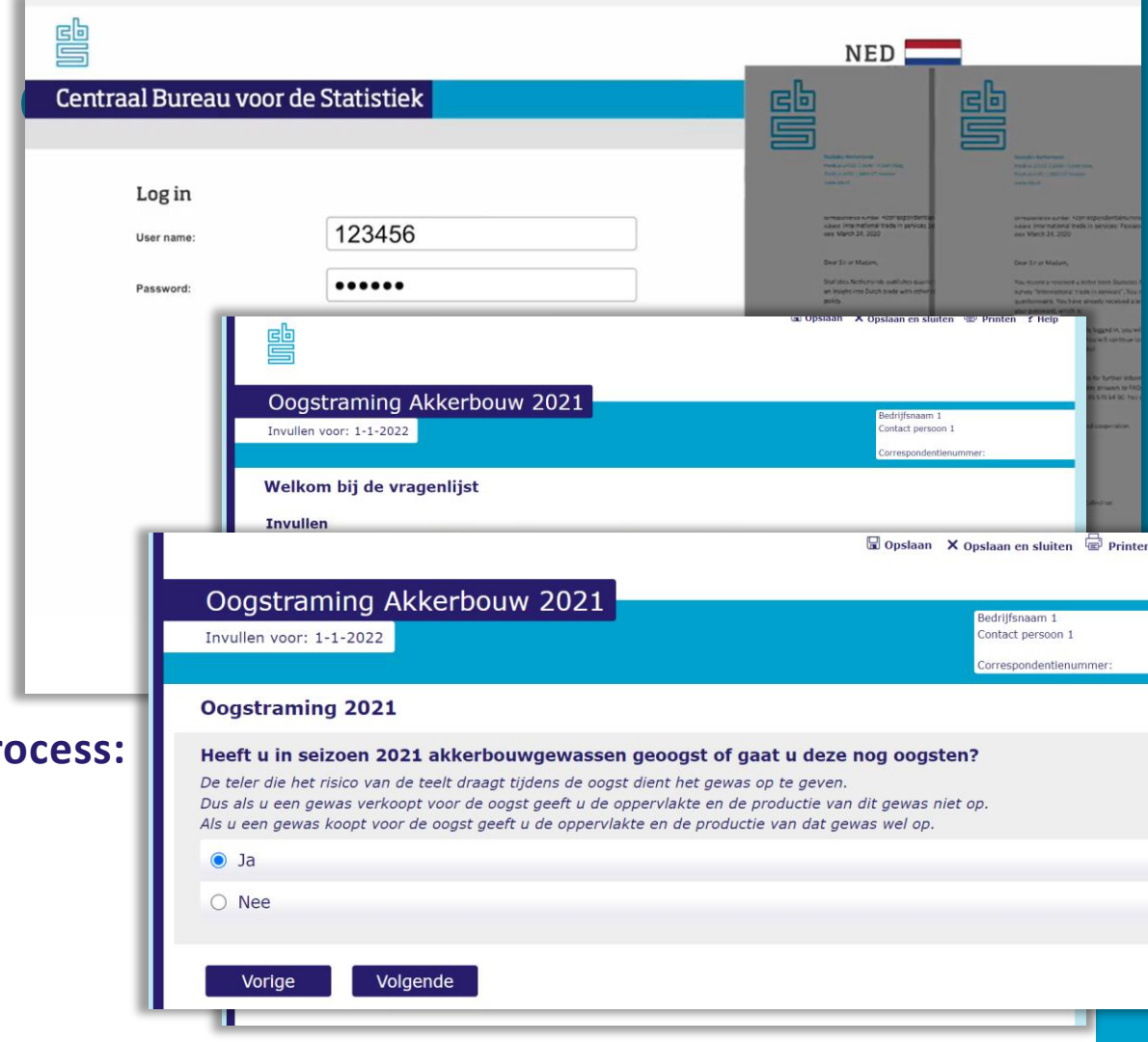
} Automation

4. Evaluation and reporting

System-to-system

1

Blaise Questionnaire



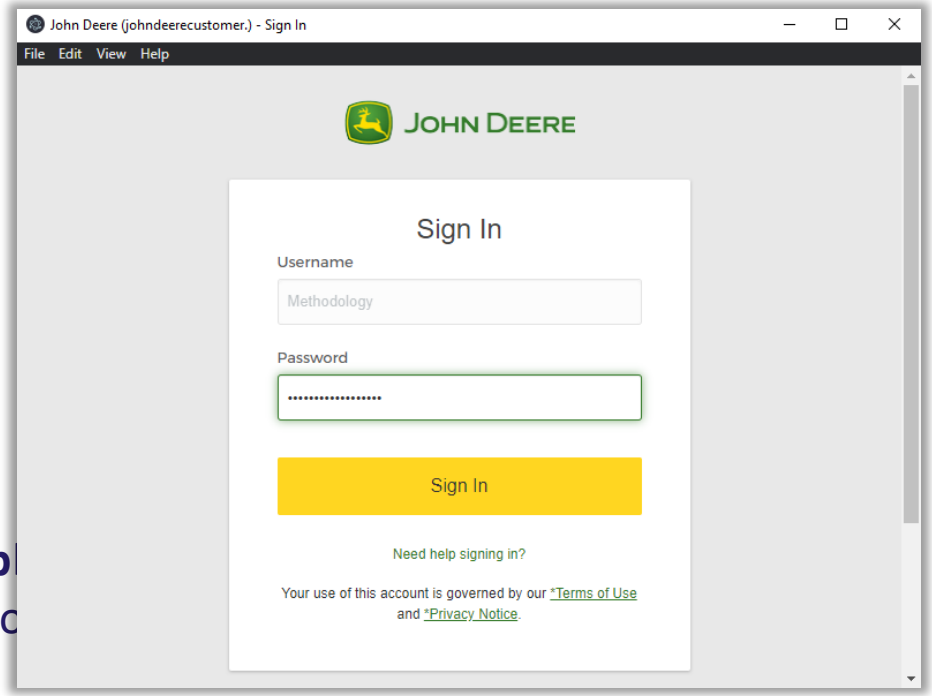
The farmer's completion process:

1. Farmer logs in to Q

System-to-system data communication

1, 2

Blaise Questionnaire

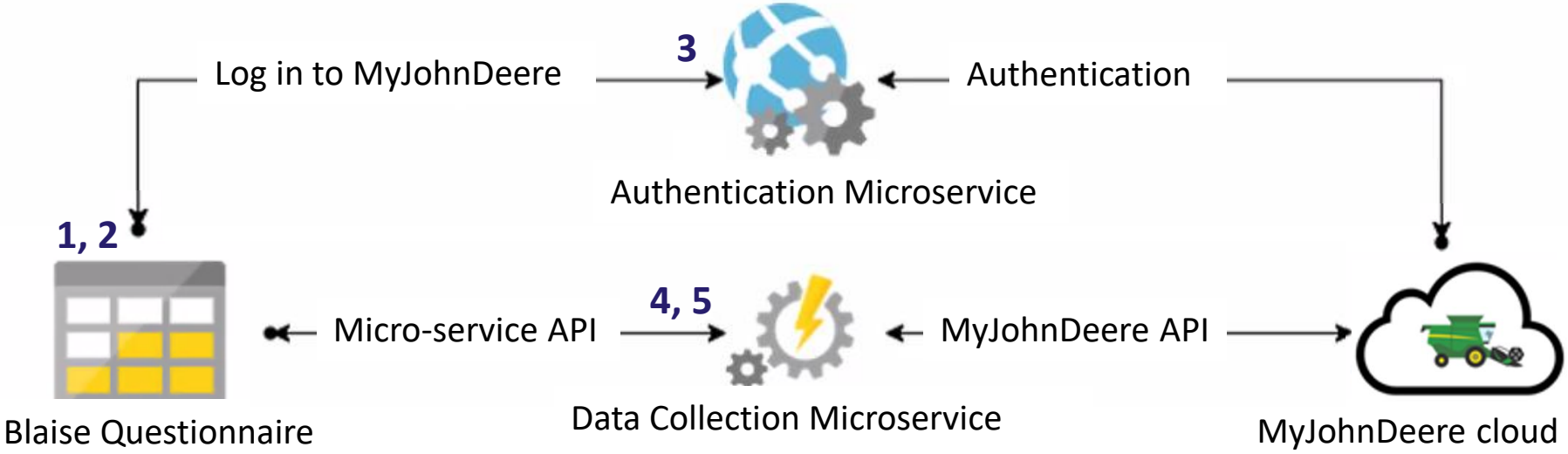


MyJohnDeere cloud

The farmer's compl

1. Farmer logs in to
2. MyJohnDeere?

System-to-system data communication

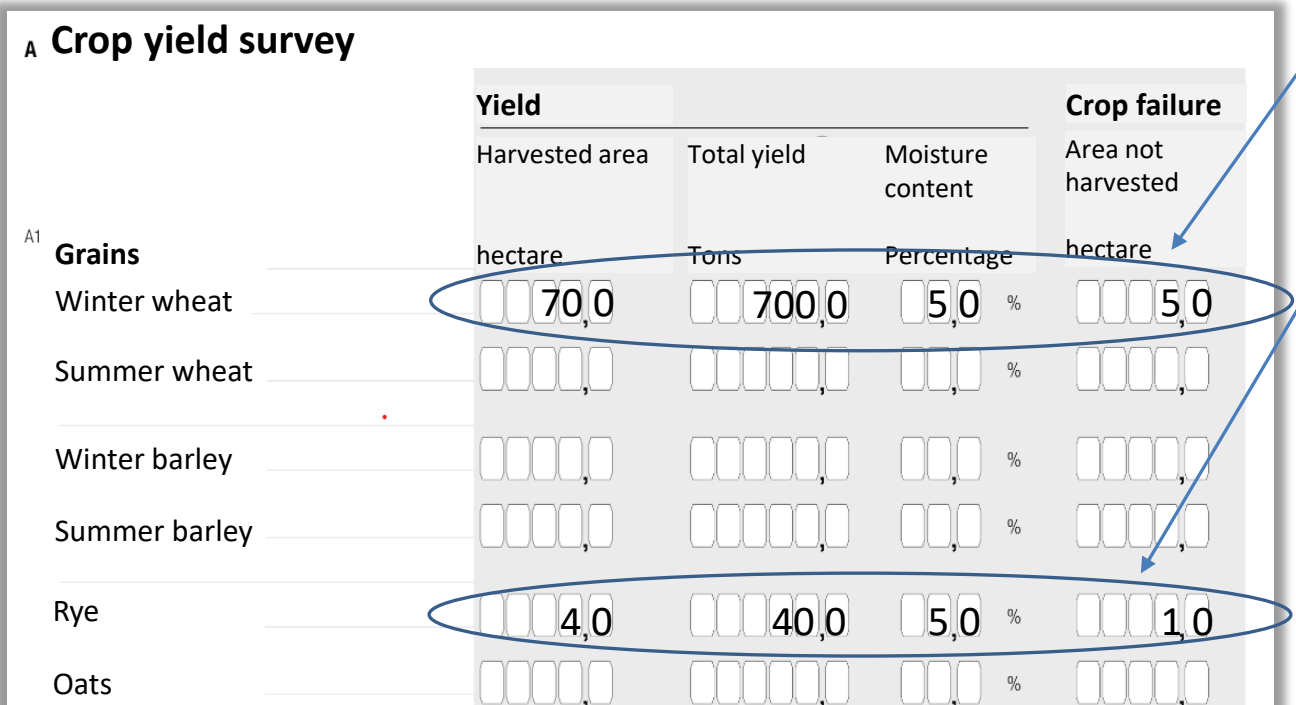


The farmer's completion process:

1. Farmer logs in to Q
2. MyJohnDeere?
3. Authentication
4. Blaise Q <-> Microservice <-> John Deere
5. Data are pre-filled

Data are pre-filled into Q

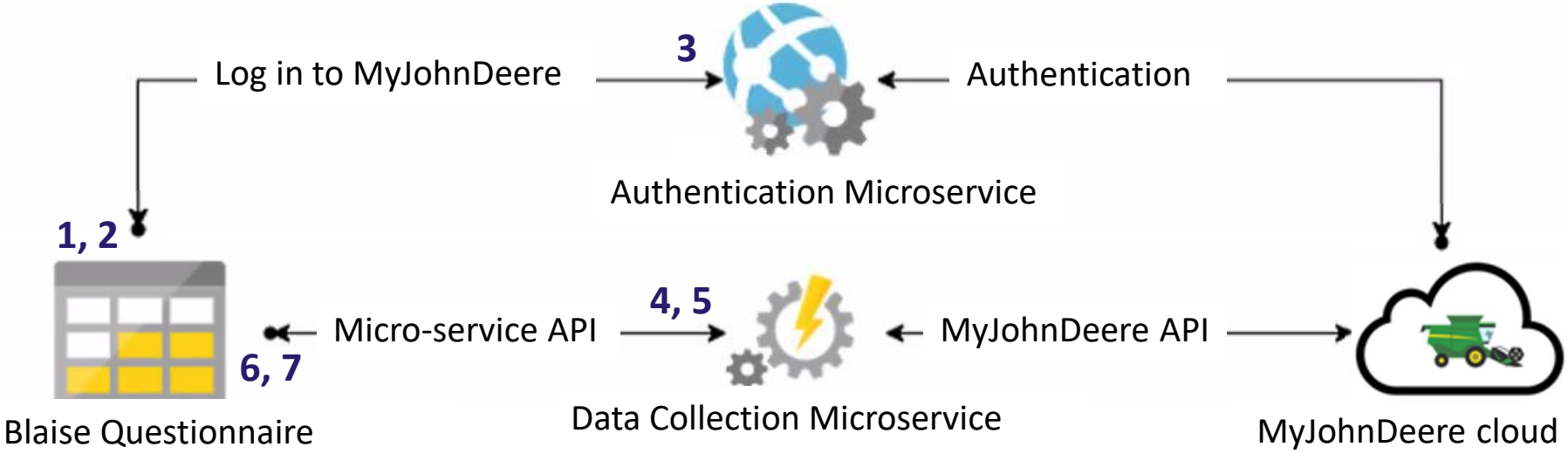
Calculated answers by Data Collection Microservice (JSON output)



A **Crop yield survey**

A1 Grains	Yield: Harvested area (hectare)	Yield: Total yield (Tons)	Yield: Moisture content (Percentage)	Crop failure: Area not harvested (hectare)
Winter wheat	70,0	700,0	5,0 %	5,0
Summer wheat			%	
Winter barley			%	
Summer barley			%	
Rye	4,0	40,0	5,0 %	1,0
Oats			%	

System-to-system data communication



The farmer's completion process:

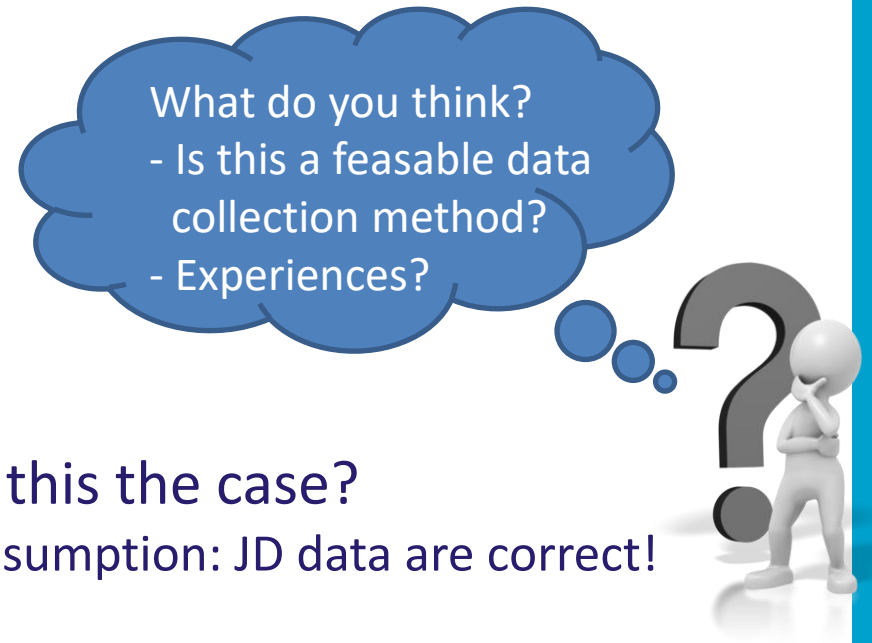
1. Farmer logs in to Q
2. MyJohnDeere?
3. Authentication
4. Blaise Q <-> Microservice <-> John Deere
5. Data are pre-filled
6. Check, edit, and add
7. Submit

Sandbox

It worked!

- Open data
  from John Deere
- Virtual farm

Research questions



Expected effects:

- Reduced response burden
- Cost reduction
- Real-time statistics
- Better data quality
- More data, more details

Is this the case?

Assumption: JD data are correct!

- How does it work in practice? **Small-scale pilot:**
  - Farmers: data from the correct farmers (units), contracted businesses, linking the data (ambiguities), trust, user experience, take-up rate, …
  - Stats NL: legal issues, system adaptations, maintenance, …
  - Script/guidelines for future projects > New vision

Precision farming

- 10-15% van farmers use precision farming techniques

Precision farming technologies penetration in Dutch arable farming (n=233)

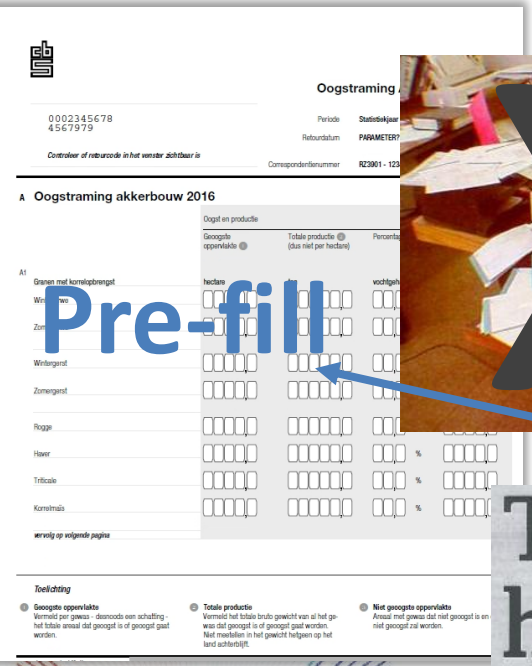
Technology	%
GPS-based steering system	>85
Site-specific crop protection	Almost 19
Crop registration software	Around 50
Business administration software	33
Decision support	30
Variable nitrogen fertilization	12,4
Field maps	14,2
Precision weed removal	4,7
Soil scans	12,4
Moisture sensors	15,5
Sow / Plant / Paw variable	11,6
Crop sensors	8,5
Satellite images	11,6
Drone images	9,5

Source:
Rabobank (2020)

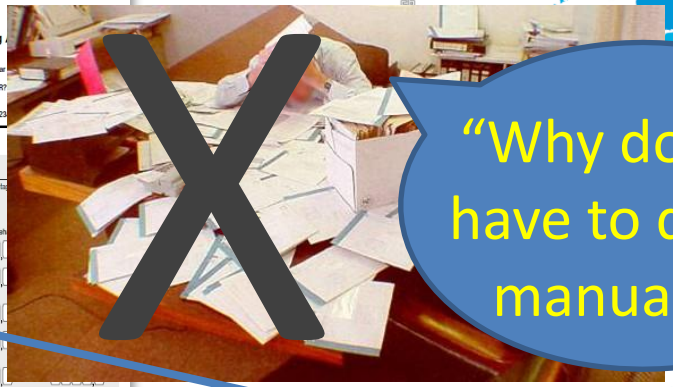
Farm Management Information Systems (FMIS)

- ± 50% of farmers
- Two most-used systems in Netherlands:
  - AgroVision AGRICULTURAL SOFTWARE
  - DACOM FARM INTELLIGENCE
- 2nd project: connect to these systems using S2S data communication

General idea



Pre-fill



"Why do I still have to do this manually?"

Pre-filling: How to make this work?

FMIS

PoC met John Deere

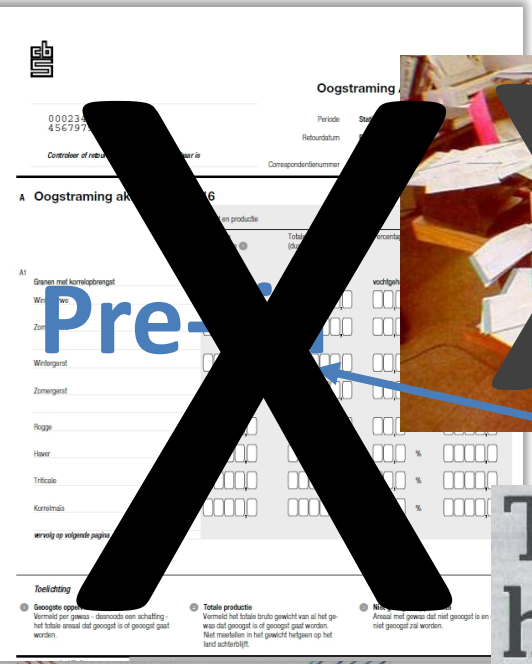
Technoboer heeft de toekomst

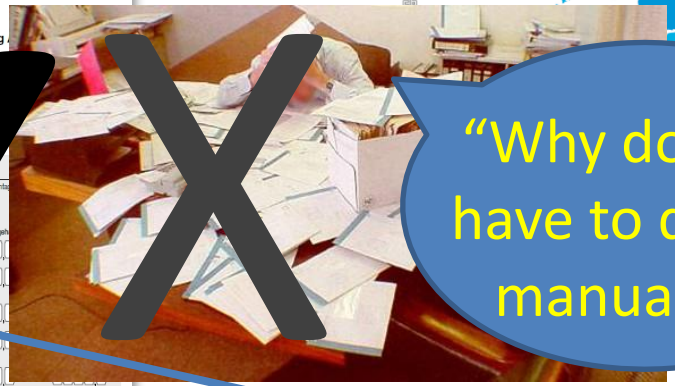
200+ registries

Techno farmer has the future

Smart industries
Smart farming

In the future





Pre-

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What do you think?
- Is this a feasable data collection method?
- Experiences?

Contact:
Ger Snijkers: g.snijkers@cbs.nl