System-to-System Data Collection in business surveys applied to an agricultural survey: small-scale pilot results

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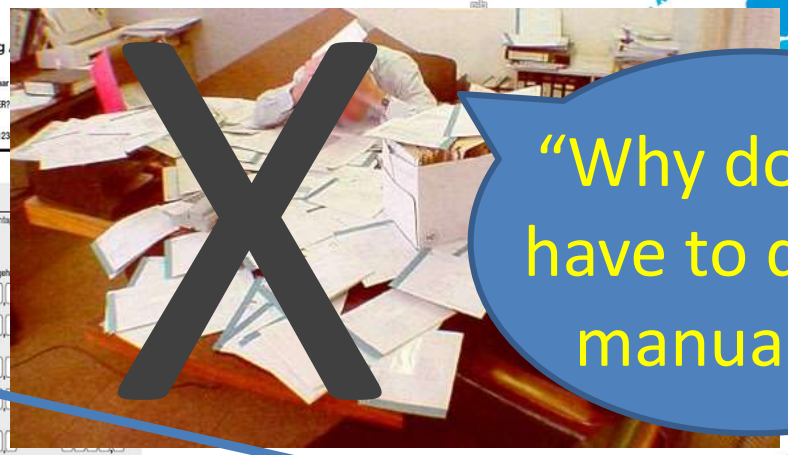
Expert Meeting on Statistical Data Collection and Sources
22-24 May 2024, Geneva, Switzerland

General idea



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

Pre-filling: How to make this work?

Pilot with JOHN DEERE

Pre-fill

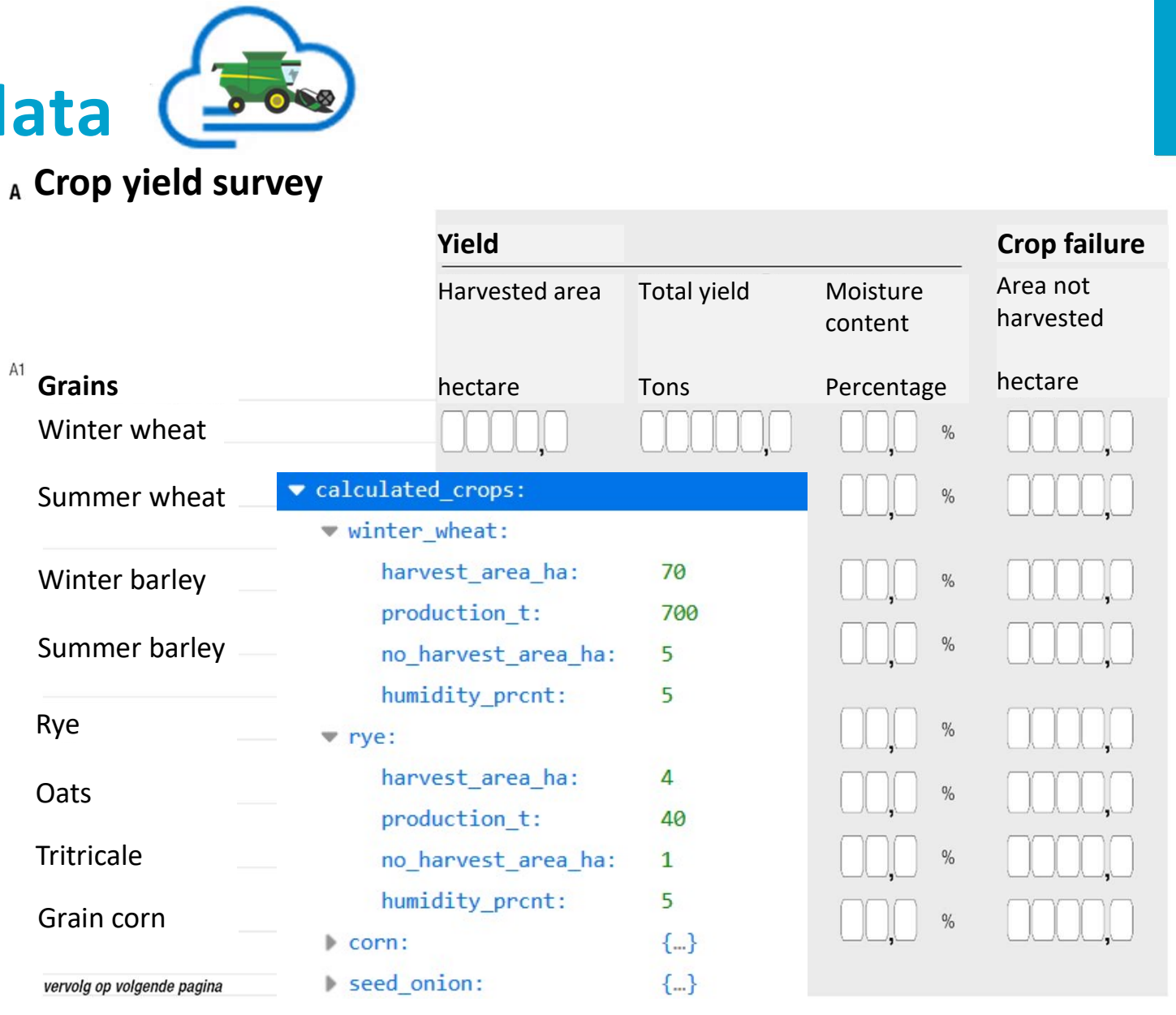
Techno farmer has the future

Smart industries
Smart farming

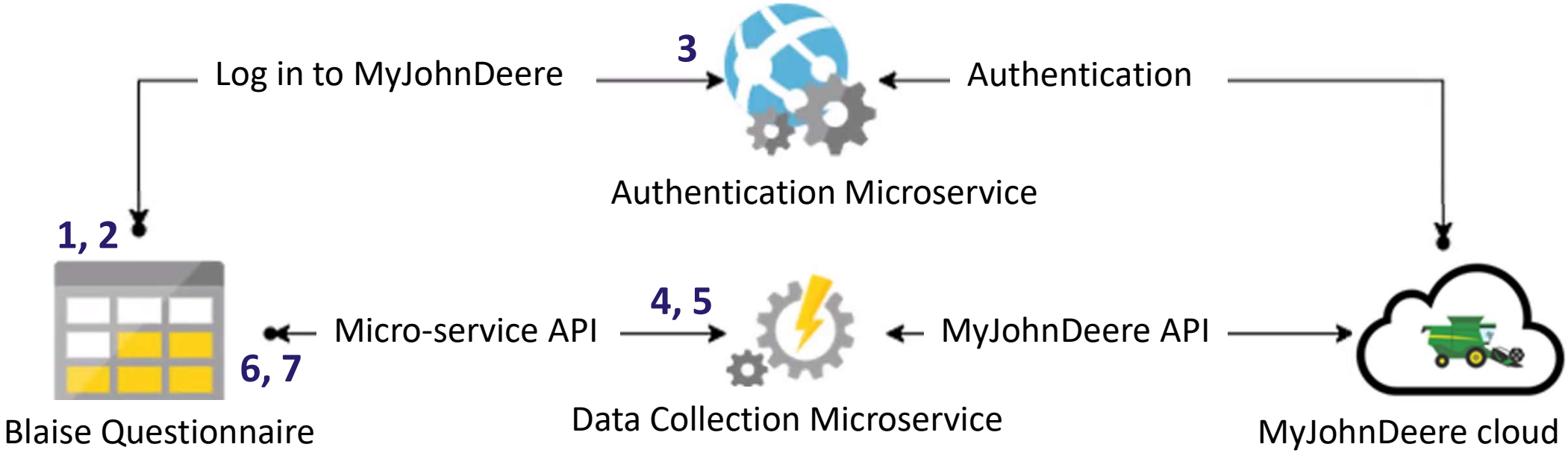
MyJohnDeere data

- Data: operations per field (event-based)
- Almost 100% overlap with data in **Crop Yield Survey** questionnaire

  > MyJohnDeere is (potentially) a good source!



System-to-system data communication



The farmer's completion process:

1. Comprehension
2. Data retrieval
3. Computation

} Automate

4. Evaluation and reporting

Test: Sandbox + technical test

It worked!

1. Sandbox:
   - open data from John Deere
   - Virtual farm

Next:

2. Technical test:
   In theory the system works!

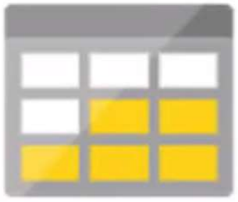
Test 3: Small-scale pilot with farmers

- How does it work in practice?
- Pre-test with 5 farmers
  - Hard to recruit!
- Pre-test results:
  - Technical issues
  - Usability issues (the farmer/user's perspective)
  - Data quality issues
  - Perceived workload
  - Trust
  - General attitude

Assumption: the data in MyJohnDeere are correct!

The implemented system pre-tested

1



Blaise Questionnaire

The farmer's completion process:

1. Farmer logs in to Q

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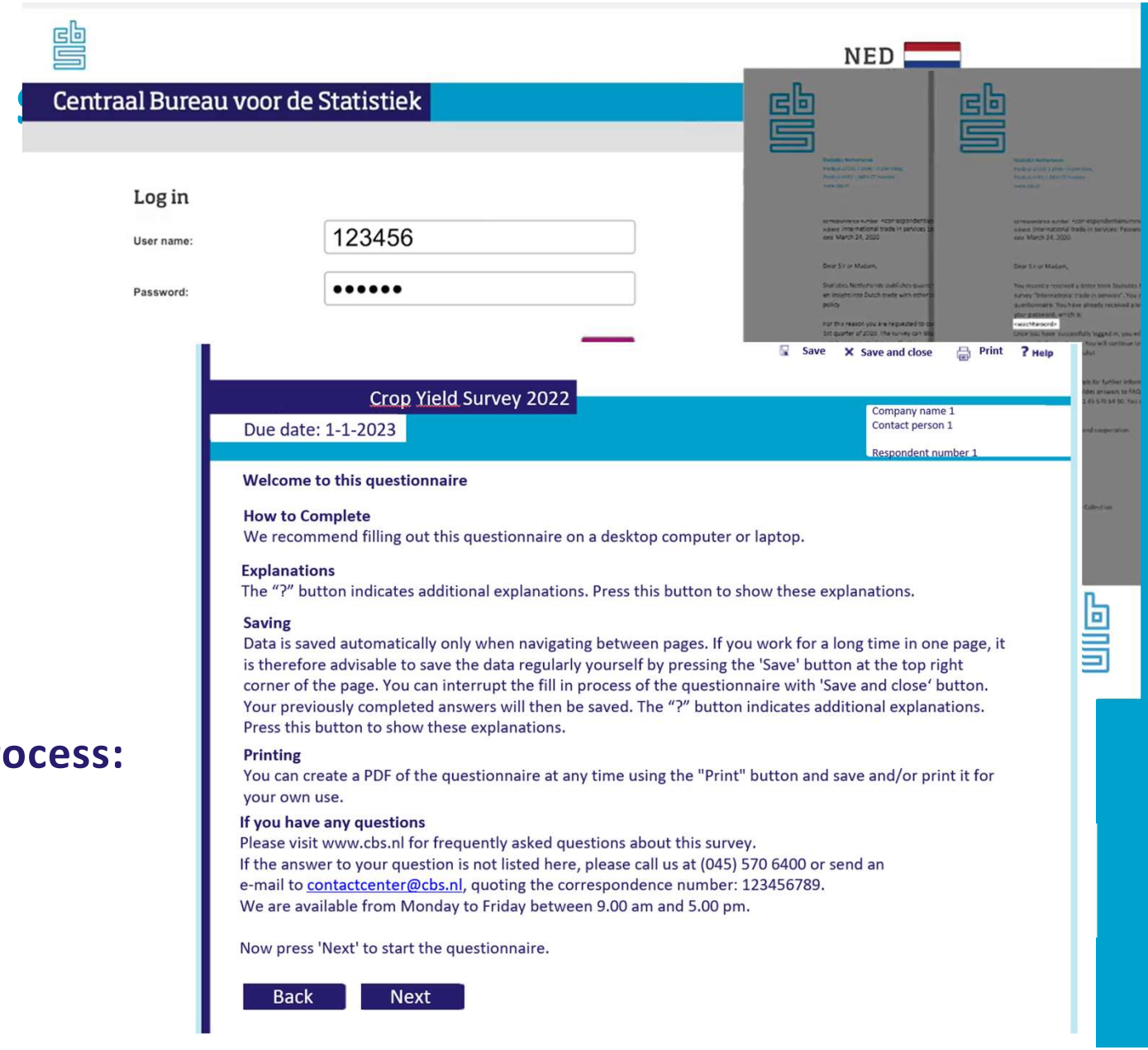

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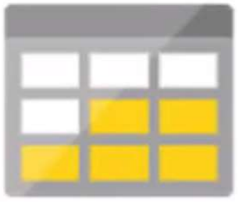

Blaise Questionnaire

The farmer's completion process:

1. Farmer logs in to Q

The implemented system pre-tested

1, 2

Blaise Questionnaire

MyJohnDeere cloud

The farmer's completion process:

1. Farmer logs in to Q
2. MyJohnDeere?

The implemented system pre-tested

First design

1, 2

Blaise Questionnaire

The farmer's completic

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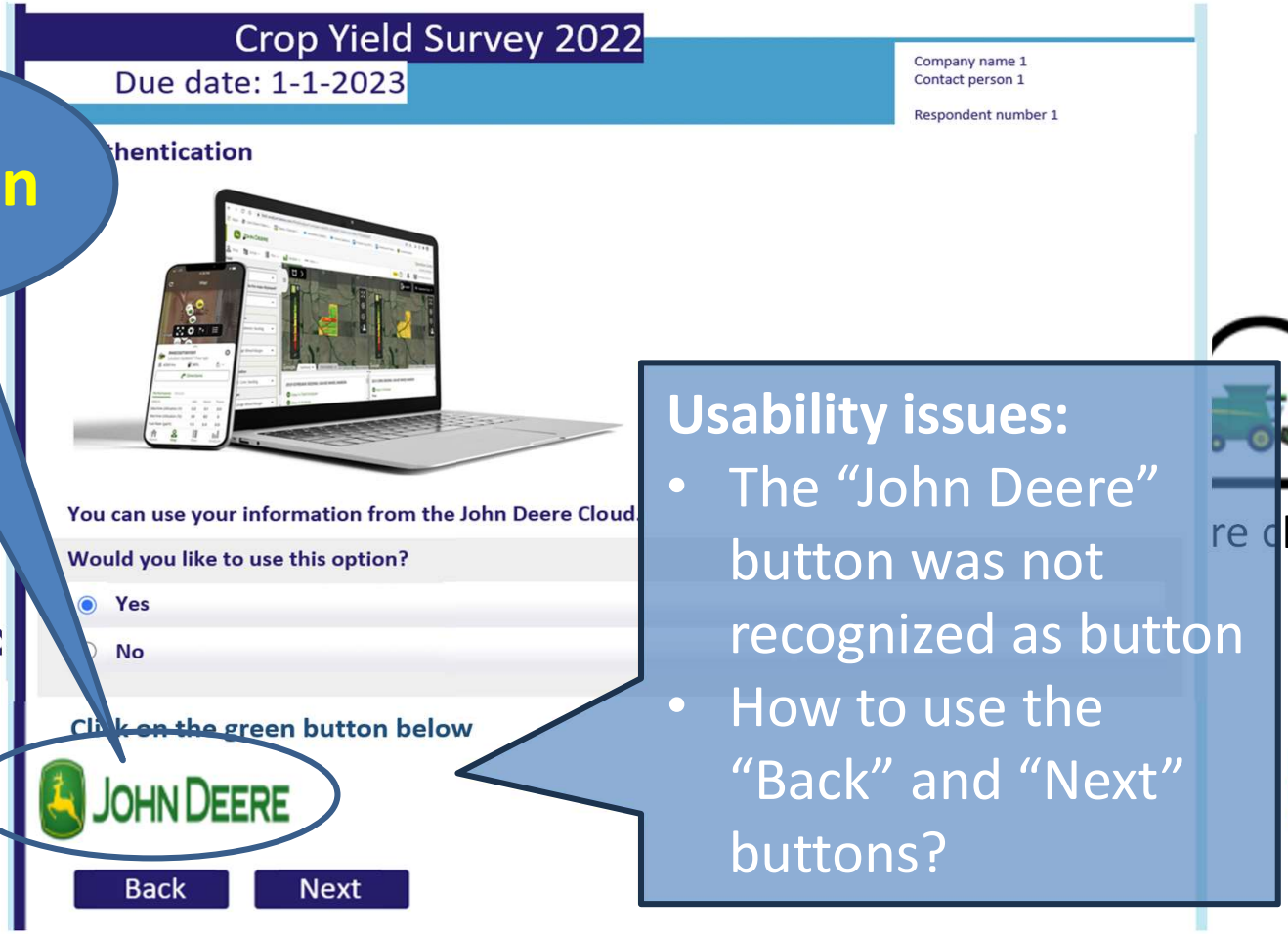


re cloud

Usability issues:

- The "John Deere" button was not recognized as button
- How to use the "Back" and "Next" buttons?

The implemented system

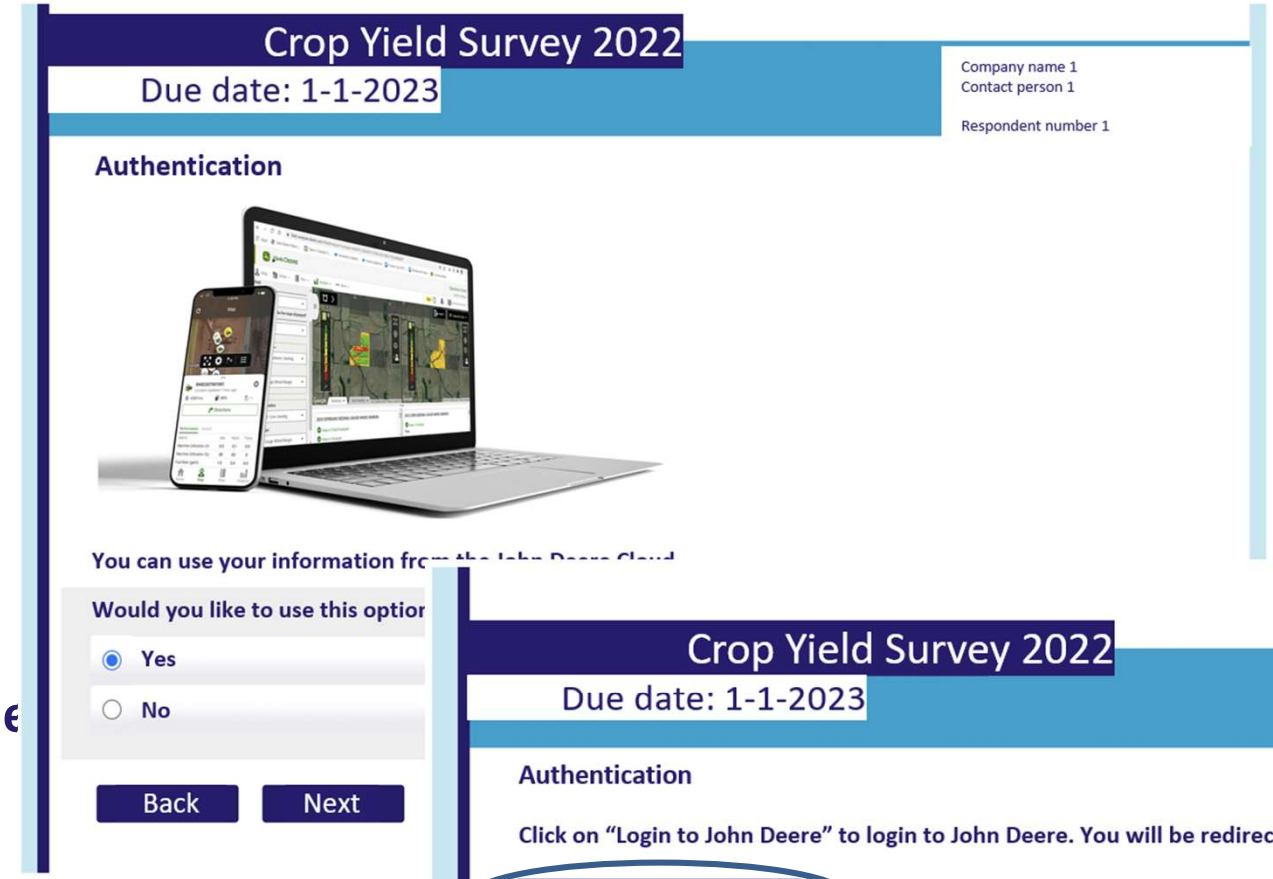
Revised design

1, 2

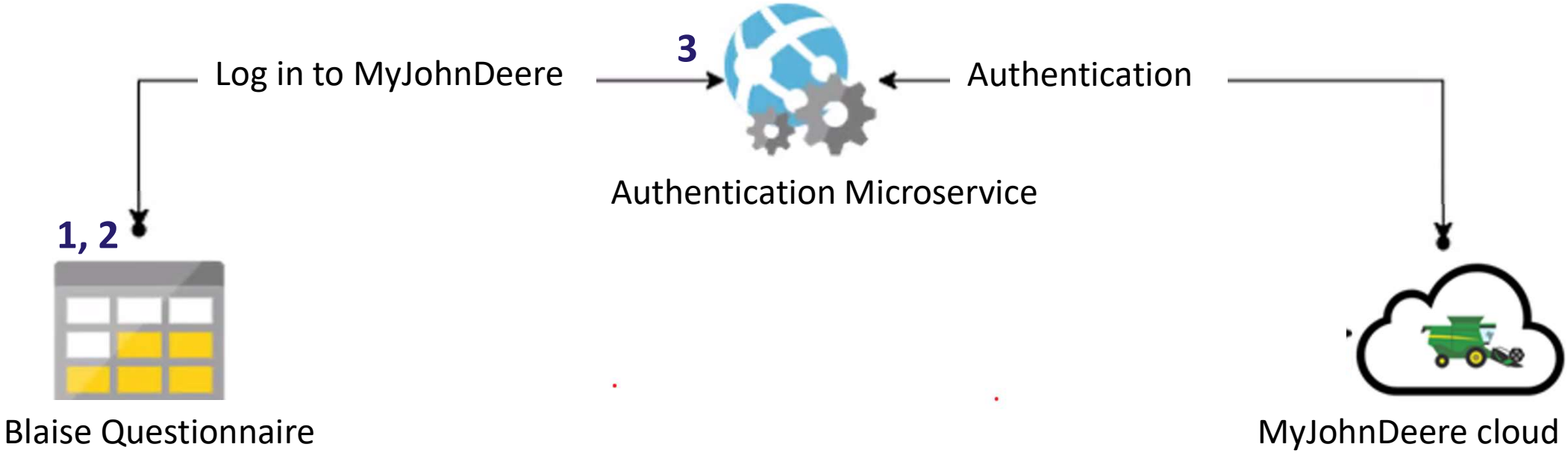
Blaise Questionnaire

The farmer's comple

1. Farmer logs in to
2. MyJohnDeere?



The implemented system pre-tested



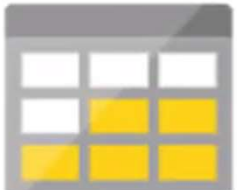
The farmer's completion process:

1. Farmer logs in to Q
2. MyJohnDeere?
3. Authentication
   Import data?

The implemented system pre-tested

In practice: more complex process

1, 2



Blaise Questionnai

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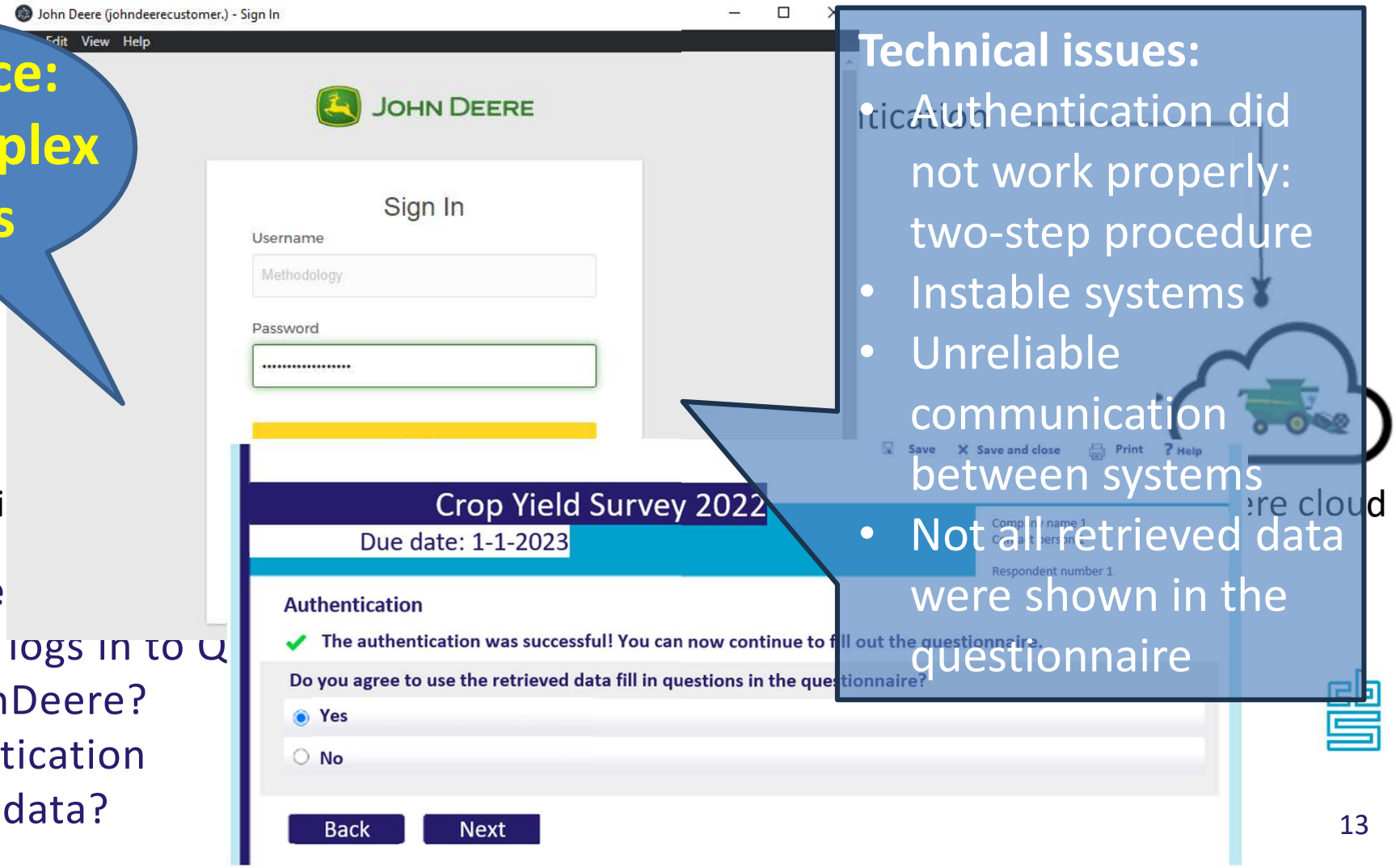
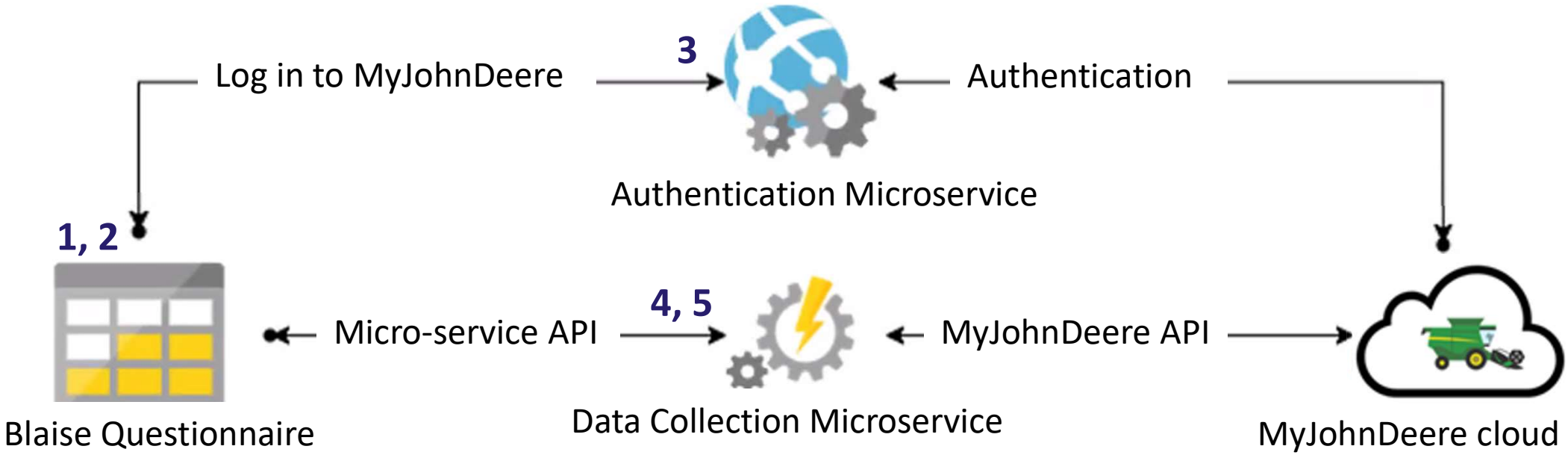


Technical issues:

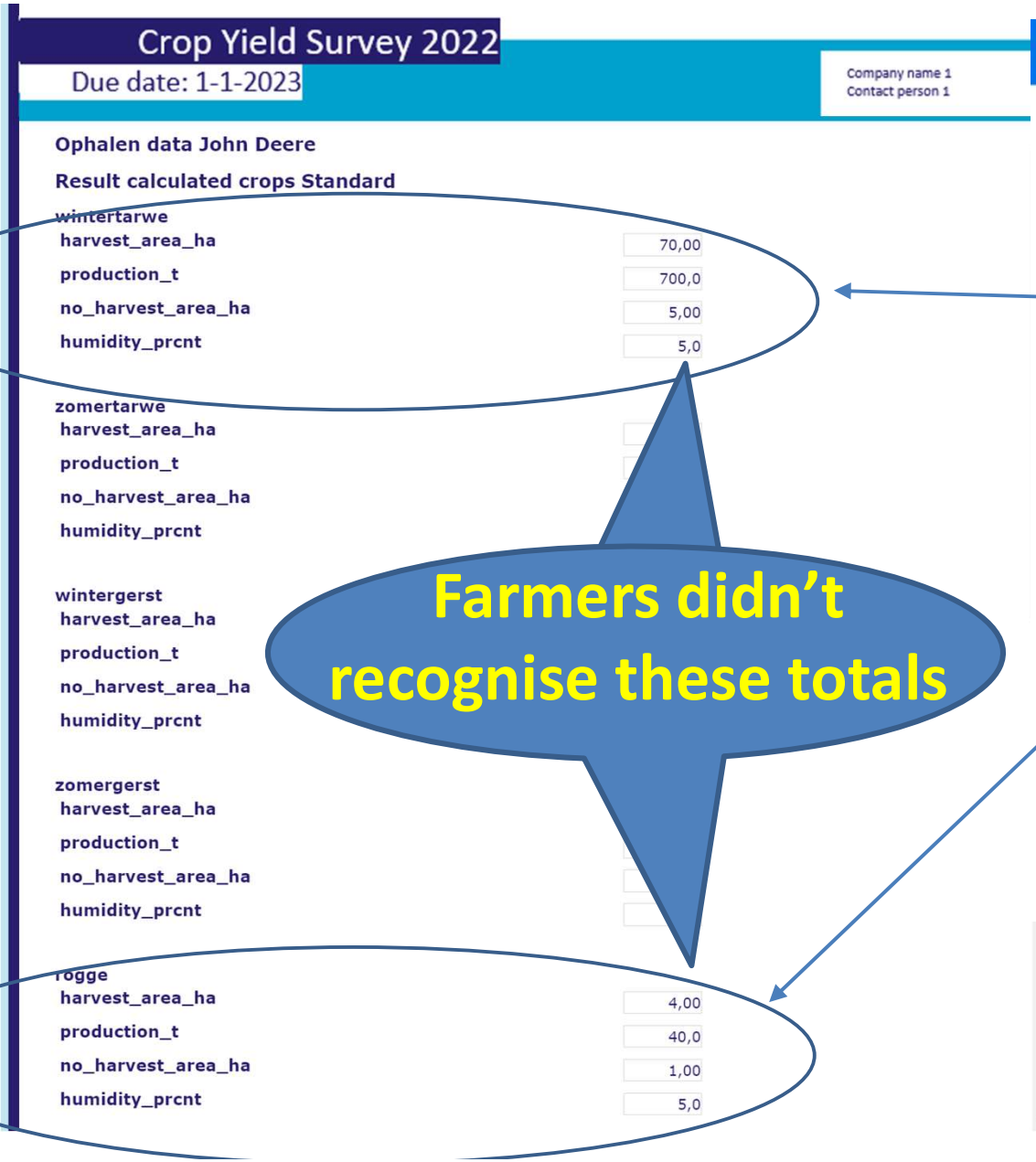
- Authentication did not work properly: two-step procedure
- Instable systems
- Unreliable communication between systems
- Not all retrieved data were shown in the questionnaire

The implemented system pre-tested

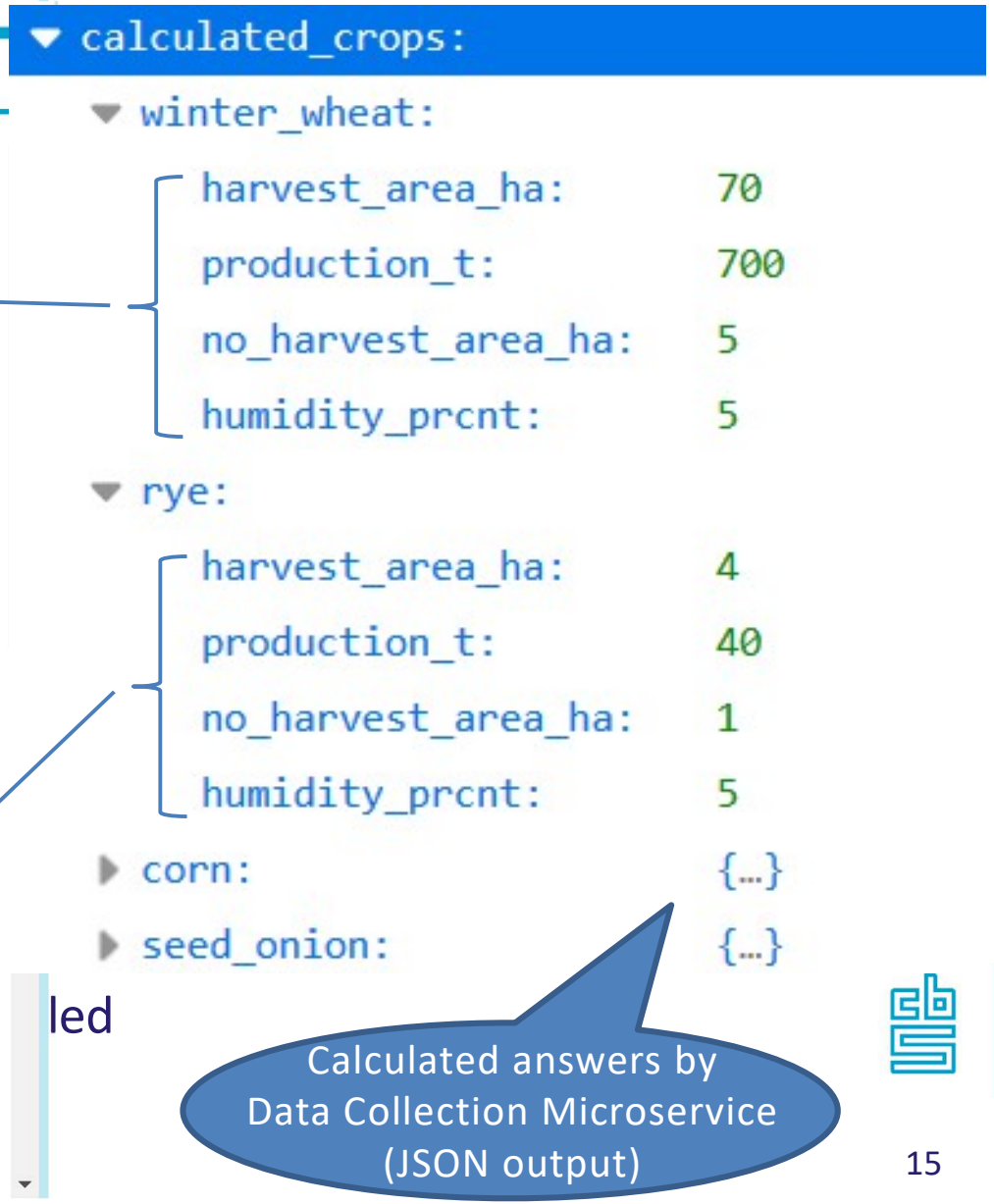


The farmer's completion process:

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

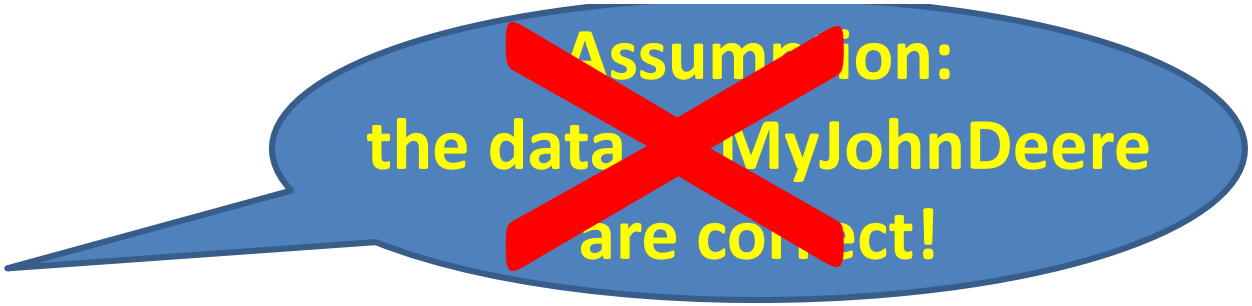


Farmers didn't recognise these totals



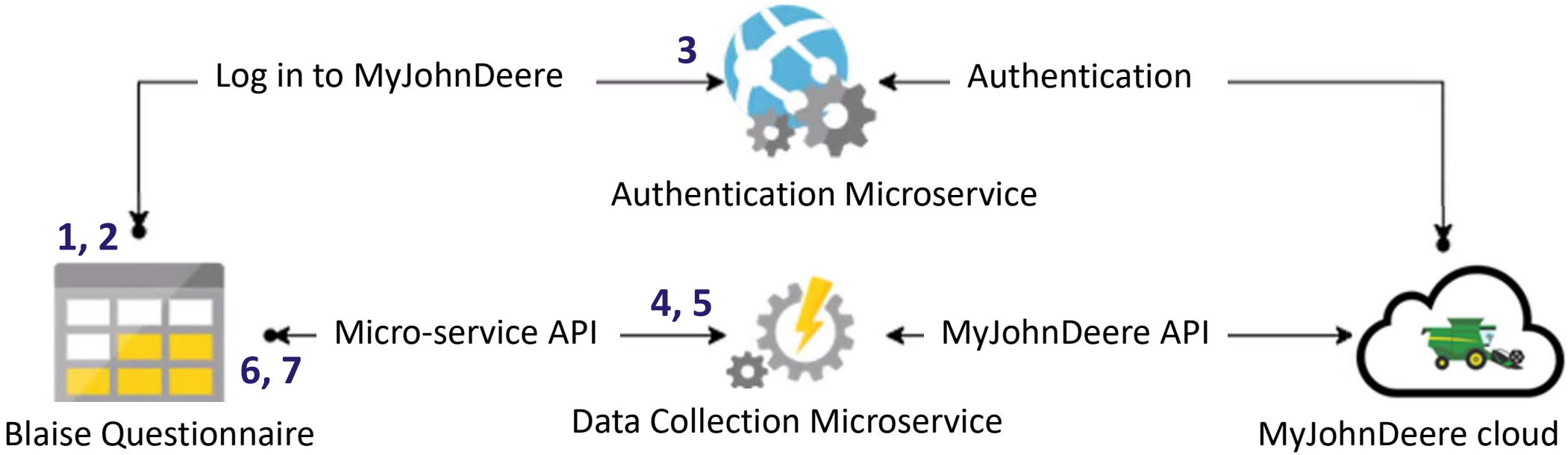
Calculated answers by Data Collection Microservice (JSON output)

Pre-test results



- Data quality issues:
  - Farmers indicated that data in “MyJohnDeere” my not be correct:
    - not calibrated (sensor calibration)
    - data in MyJohnDeere cannot be edited
    - MyJohnDeere is not designed to be a Farm Management Information System; primary purpose is for machine maintenance
    - Farmers used their FMIS to check the data (Dacom & AgroVision)
  - Missing data:
    - Crops harvested with machines not connected to MyJohnDeere: JohnDeere tractors, other brands
    - Crops harvested by contracters
  - Unit issues:
    - Data from neighbours: helping out
  - Selectivity:
    - Market share (small; FMIS: 50% of arable farmers) and take-up rate

The implemented system pre-tested



The farmer's completion process:

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

Save Save and close Print Help

Crop Yield Survey 2022

Due date: 1-1-2023

Company name 1
Contact person 1

Respondent number 1

Winter wheat estimates

Production data from 2021

- Please complete all answer fields and make an estimation if necessary. Enter a 0 in the fields that are not applicable.
- Round up area questions to two decimal places and other questions to one decimal place.

Harvested area of winter wheat 70,00 ha
Indicate the total area harvested or to be harvested.

Total winter wheat 700,00 ton
Indicate the total gross weight of all the crops harvested or to be harvested.
The weight of the crop left in the field should not be included.

Yield per hectare 10,00 ton/ha

The yield per hectare seems improbable
Please correct your answer on the total grain corn yield.
Please provide an short explanation otherwise.

Percentage moisture content 5,0 %

Area not harvested 5,00 ha
Area with crop that has not been or will not be harvested.

Back Next

3. Authentication
   Import data?

ion

API

MyJohnDeere cloud

6. Check, edit,
7. Submit

Save Save and close P

Crop Yield Survey 2022

Due date: 1-1-2023

Company name 1
Contact person 1

Respondent number 1

Submission

This is the end of the questionnaire. Press the "Submit" button to submit the answers to Statistics Netherlands.

Back Submit

Pre-test results

- Perceived workload:
  - “This doesn’t make it easier.”
  - “This doesn’t reduce the time I need compared to completing the questionnaire in the usual way.”
- Trust:
  - Trust in the goverment
    - Farmers don’t trust the government with their data: data are NOT shared
  - Trust in the system
    - Safe and secure data communication
    - Farmers are unaware of safety measures being taken: penetration test (to find leaks, prevent hacking)

Pre-test results

General conclusions:

- General attitude:
  - These farmers were positive about the S2S approach
  - It could work, but improvements are needed to make it work in practice
- Selective group of farmers:
  - Innovative farmers
  - Positive attitude towards data and innovations
  - They are the early adopters!
- “Use FMIS systems instead”: better source to connect to!

Conclusions

- Go/No-Go decision:
  not implemented in the Crop Yield Survey
  - Too many issue: the risks of failure weres too high.
    This operationalisation was not efficient for farmers
  - Low market share and low take-up rate
  - Production issues for this operationlisation of the methodology: maintainability, scalability, and costs were not met, compared to the assets
  - No time / resources for improvements
- Still: we have a working proof-of-concept

Next step

Farm Management Information Systems (FMIS):

- Two most-used systems in Netherlands:
  - AgroVision AGRICULTURAL SOFTWARE
  - DACOM FARM INTELLIGENCE
- 35-55% of farmers:
  - Crop Yield Survey: AgroVision 21%, Dacom 5%, other 7% of farmers
  - Annual Agricultural Counts: 56% of all farmers use a FMIS
  - 45% of fields with the largest crops is registered in AgroVision
- Next project: connect to these systems

  > positive business case!

What do you think …

- **Is this a feasable data collection method?**
- **Experiences?**

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