# POSHMyCo
ICT-AGRI-FOOD Project

Potential of selective harvest based on mycotoxins content assessment in cereal crops

SUMMARY

Aim of the project is to develop a system for the forecast and detection of the spatial distribution of *Fusarium* Head Blight (FHB) in the field, to predict the spatial distribution potential of mycotoxin contamination. Preventive site spraying and selective harvest will minimize *Fusarium* risks.

RESEARCH QUESTION

Can Precision Agriculture help to minimize the contamination of mycotoxins in cereals?

Wheat & Barley

Sensing
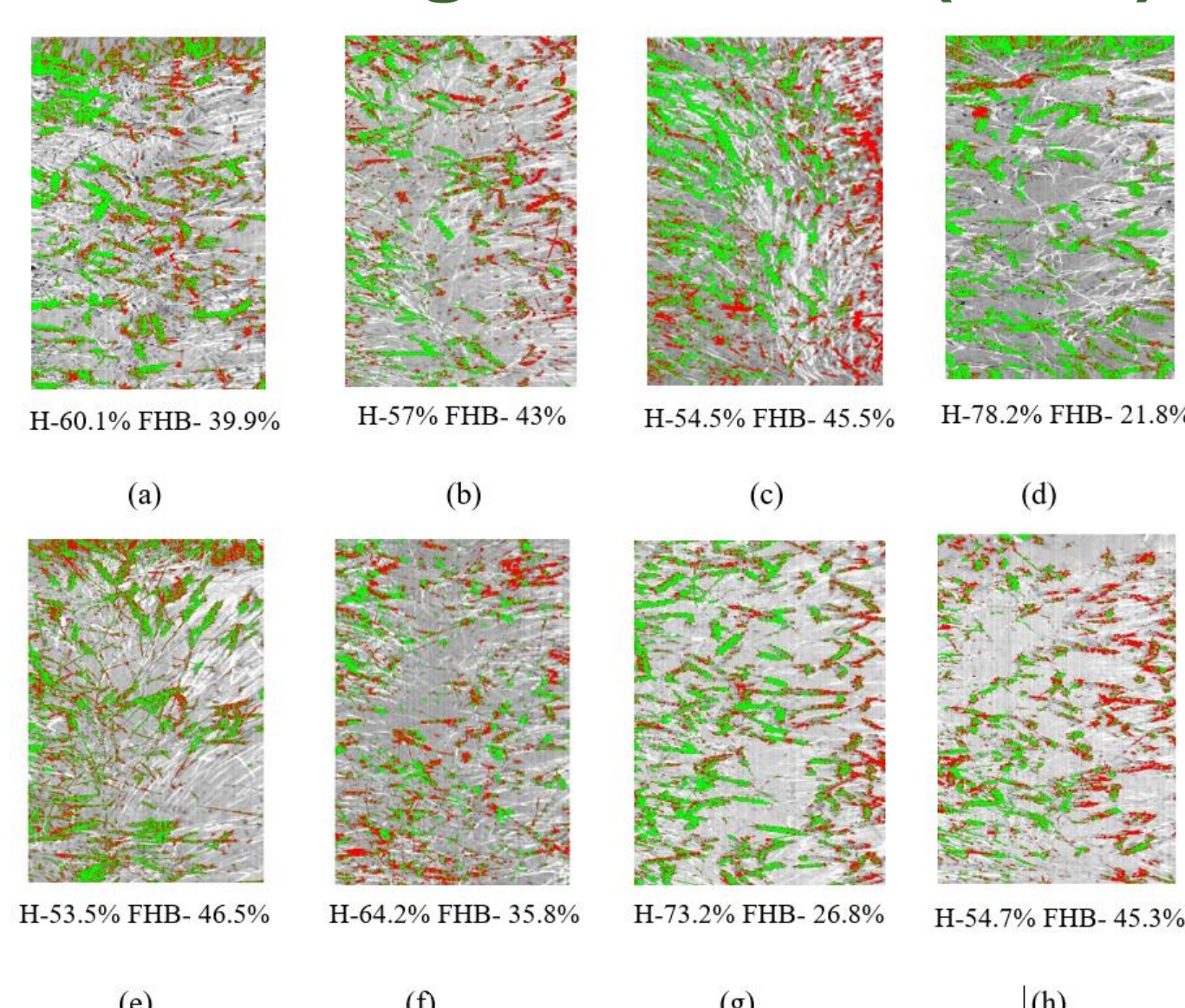
Cloud intelligence

Modelling

PSSS

SH
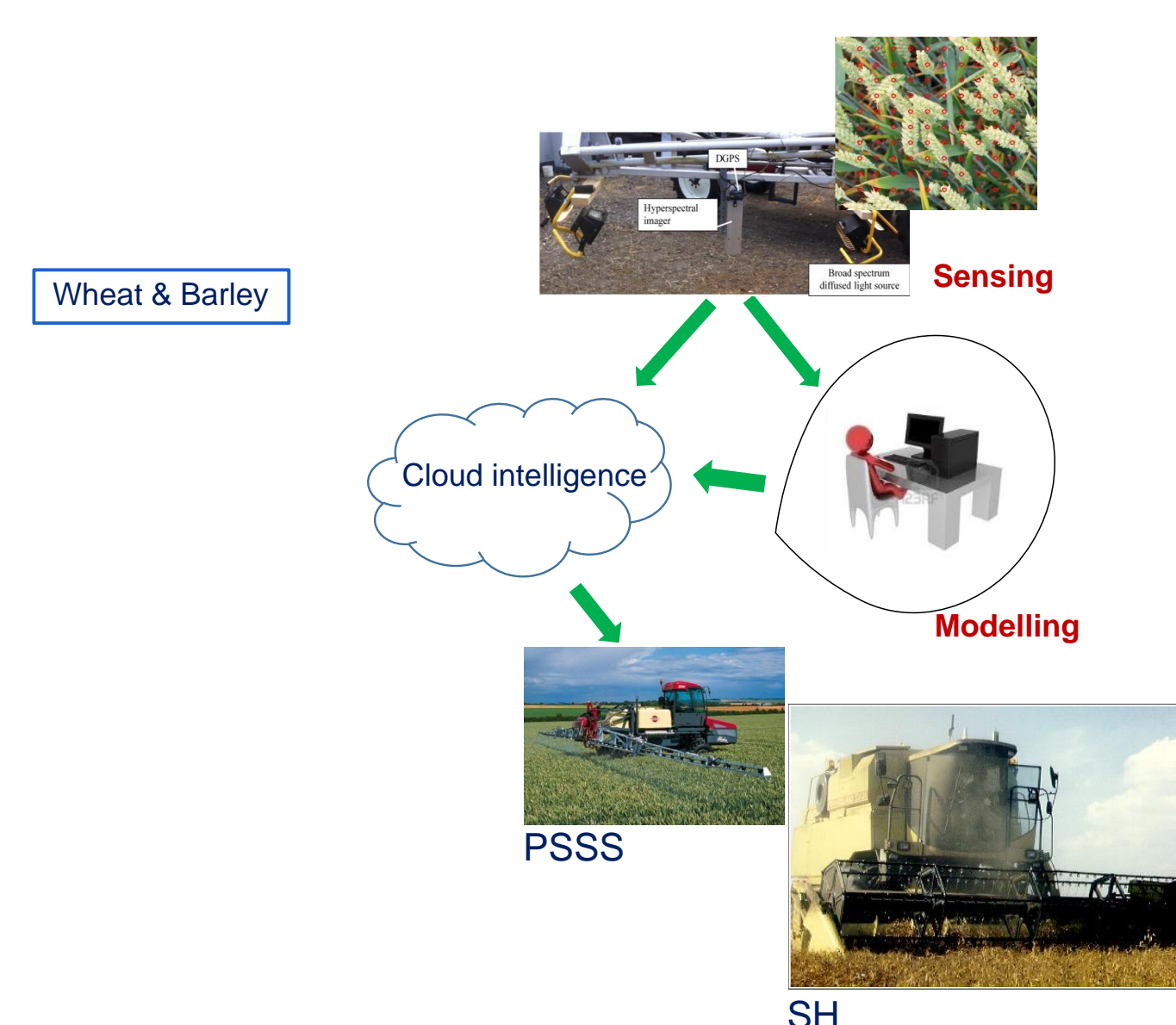
MAIN OBJECTIVES

- Developing a system for the forecast and detection of the spatial distribution of FHB in the field, to predict the potential spatial distribution of mycotoxin contamination.
- Reducing the risk of mycotoxin contamination of harvested grains thanks to the preventive site-specific spraying (PSSS).
- Classified the grain in three categories thanks to the selective harvest (SH).

PRELIMINARY RESULTS

Estimated percentage coverage of fusarium head blight disease (FHB) and healthy (H)

H-60.1% FHB- 39.9% (a)
H-57% FHB- 43% (b)
H-54.5% FHB- 45.5% (c)
H-78.2% FHB- 21.8% (d)
H-53.5% FHB- 46.5% (e)
H-64.2% FHB- 35.8% (f)
H-73.2% FHB- 26.8% (g)
H-54.7% FHB- 45.3% (h)

a) Bennington
b) Campesino
c) Crossway
d) Informer
e) LG Keramik
f) LG Spotlight
g) Positive
h) RGT Gravity.

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accuracy score: 0.9286

Classification Report:
              precision    recall  f1-score   support

           1       0.91      1.00      0.95        10
           2       0.89      0.89      0.89         9
           3       1.00      0.89      0.94         9

    accuracy                           0.93        28
   macro avg       0.93      0.93      0.93        28
weighted avg       0.93      0.93      0.93        28
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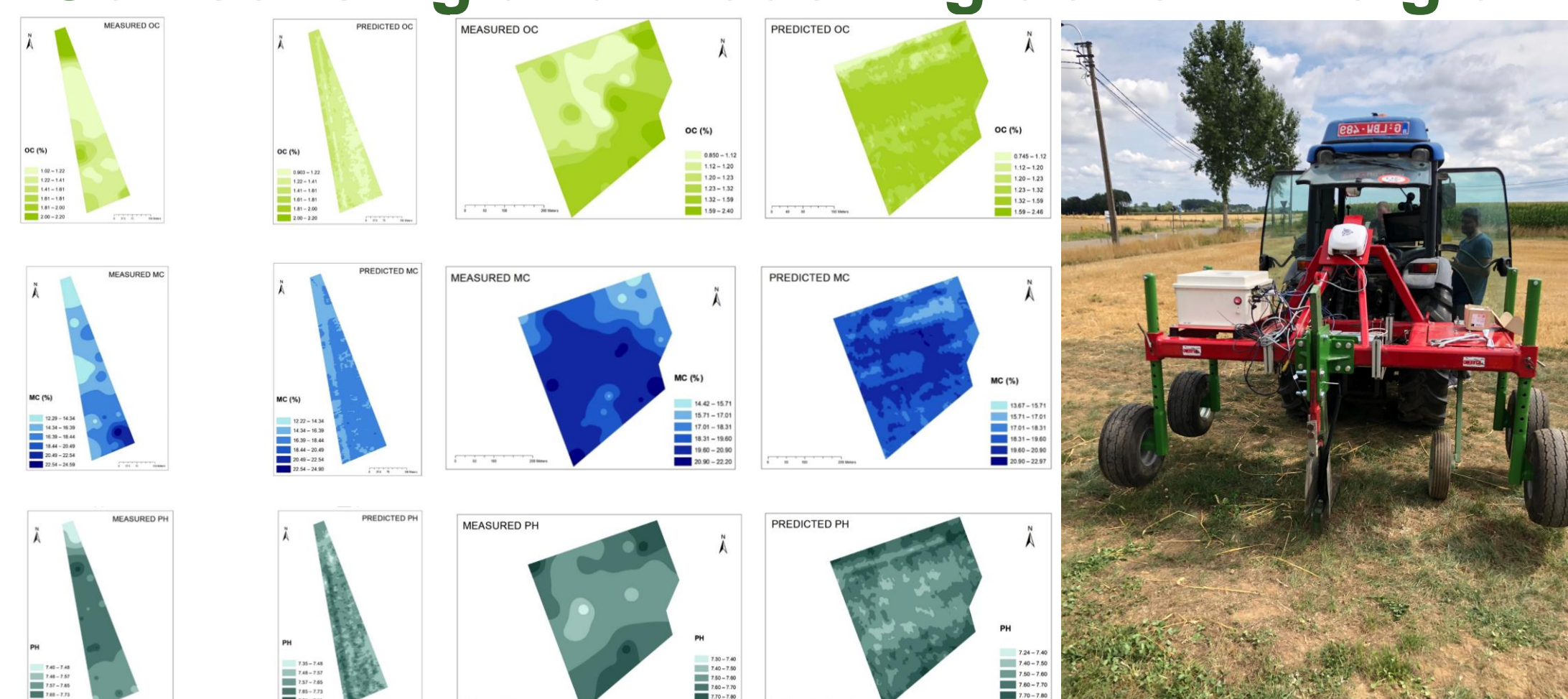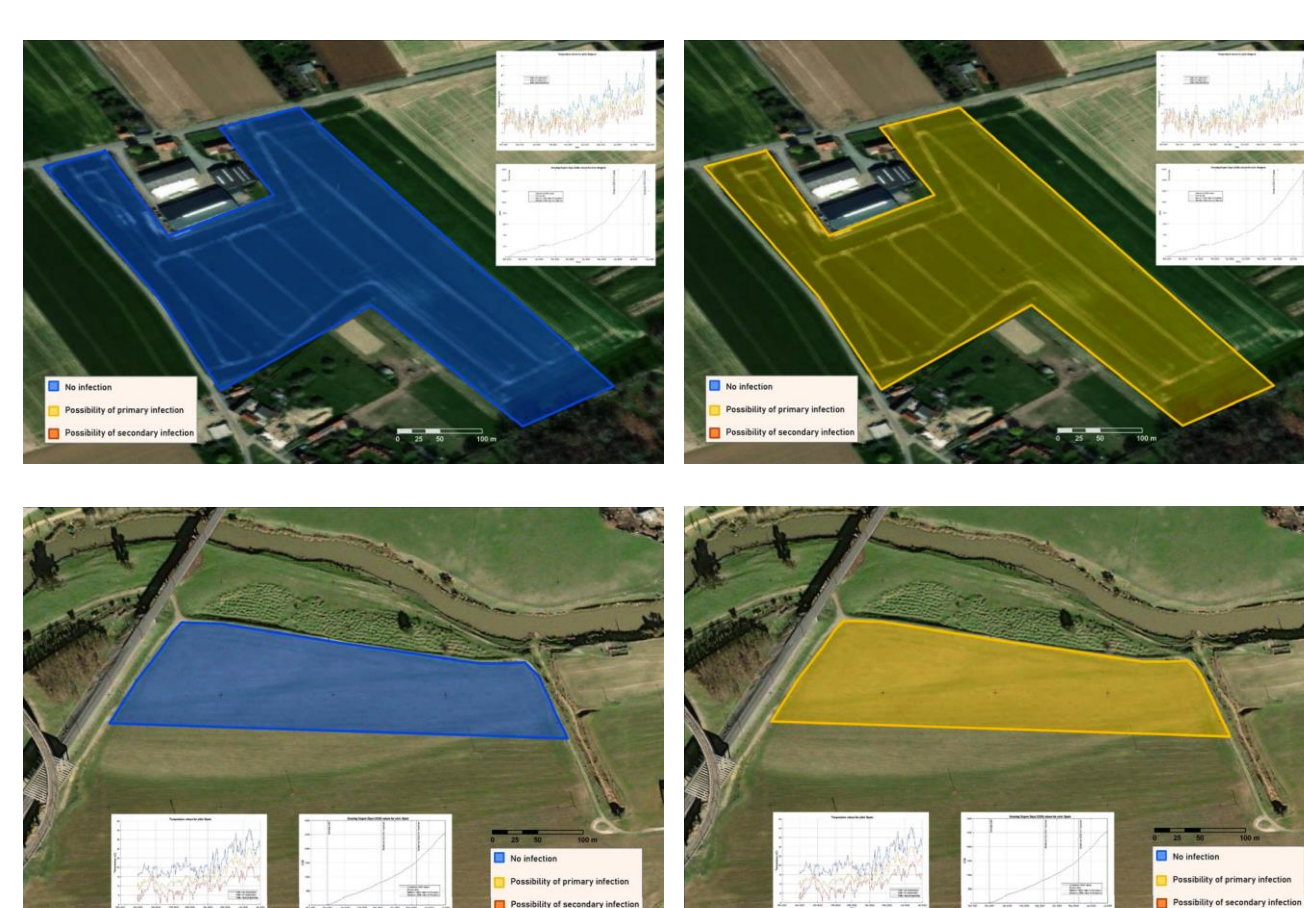
A non-invasive approach of DON levels in FHB

Three levels of mycotoxin were classified with an accuracy of **0.93** using RandomForest Classifier model. Classification according to Regulation No 1881/2006, Recommendation N 2006/576/EC

Soil sensing and modelling done in Belgium

Fusarium risk model

Harvester route planning tool

Calculation of the recommended SH (Selective Harvest Map) and the optimal route to follow

PRELIMINARY CONCLUSIONS & POTENTIAL IMPACT

Economic impacts
- Increased farmers' income return by sorting the grain yield into different contamination classes: reducing rejection rate and increasing the market value.

Environmental impacts
- Reducing the amount of agrochemicals applied into the soil, ground, and surface water resources.

Societal impacts
- Securing clean of mycotoxin-contaminated grains will reduce the risk to human health, leading to a better food safety

Scientific impacts
- The integrated hardware and software infrastructure can be used for future research projects in the context of precision agriculture: selective harvest .

The POSHMyCo project was presented in the annual 28th International Scientific-Practical Conference "Human and Nature Safety 2022" which took place in Lithuania at the Academy of Agriculture of Vytautas Magnus University on May 4-6, 2022

FUTURE RESEARCH ACTIVITIES

- FHB and DON maps at field conditions
- Data fusion to build FHB models with more accuracy
- Communicate with key stakeholder groups to promote the adoption of the combined solution

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Topic 1: Data-driven ICT platforms and solutions to improve the sustainability of agri-food systems