

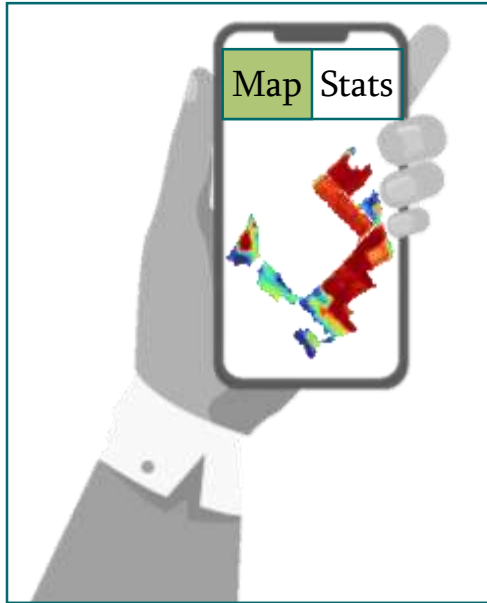
Deployment of models predicting compressed sward height on Wallonia: confrontation to ground truth



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7 September 2022

Objective:
Decision support system
to help manage feed wedge



Map	Stats
Parcel id:	123456
Mean available CSH:	XX mm
Theoretical biomass:	YY kg

Objective

Behind the scenes

Results

Trust

Comparison

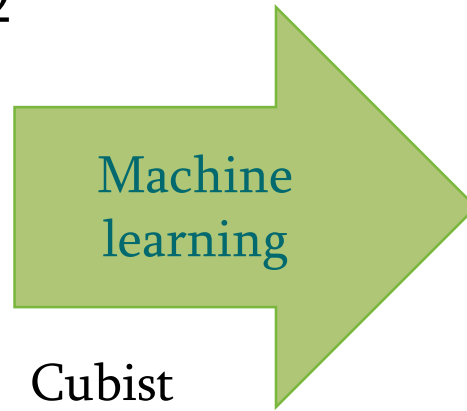
Final output

What lies behind?



Sentinel-1

Sentinel-2



Cubist
Neural network
Random forest
XGBoost
GLMnet



Meteorological
data



Compressed sward
height (CSH)

Objective

Behind the
scenes

Results

Trust

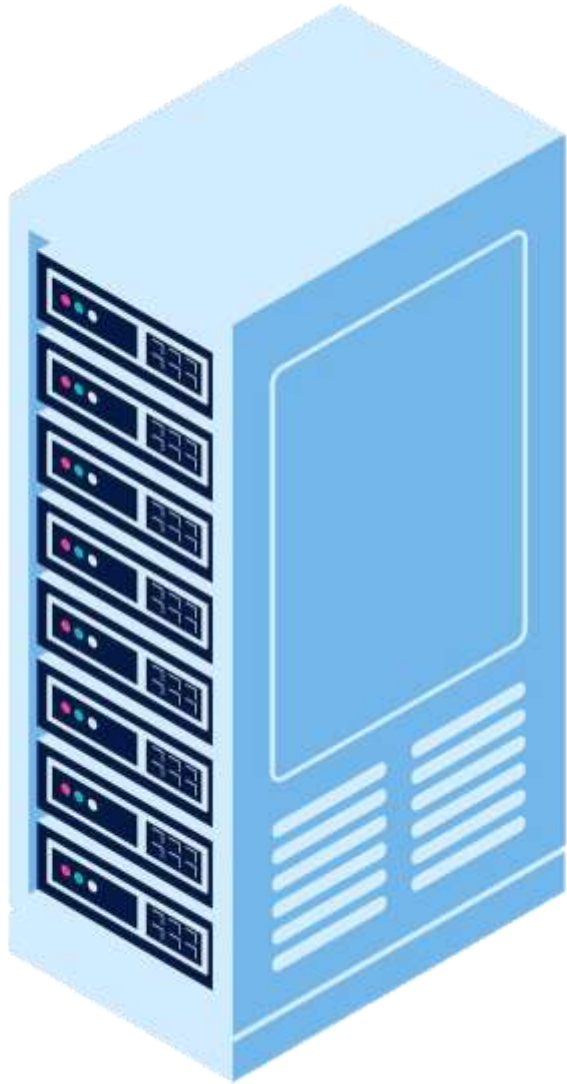
Comparison

Final output

What lies behind?

Area of interest: Wallonia

Pastures: >4.000km²



To go from local to global:
Prediction platform on servers

Scale: Wallonia

Period: 2018 - now

Objective

Behind the
scenes

Results

Trust

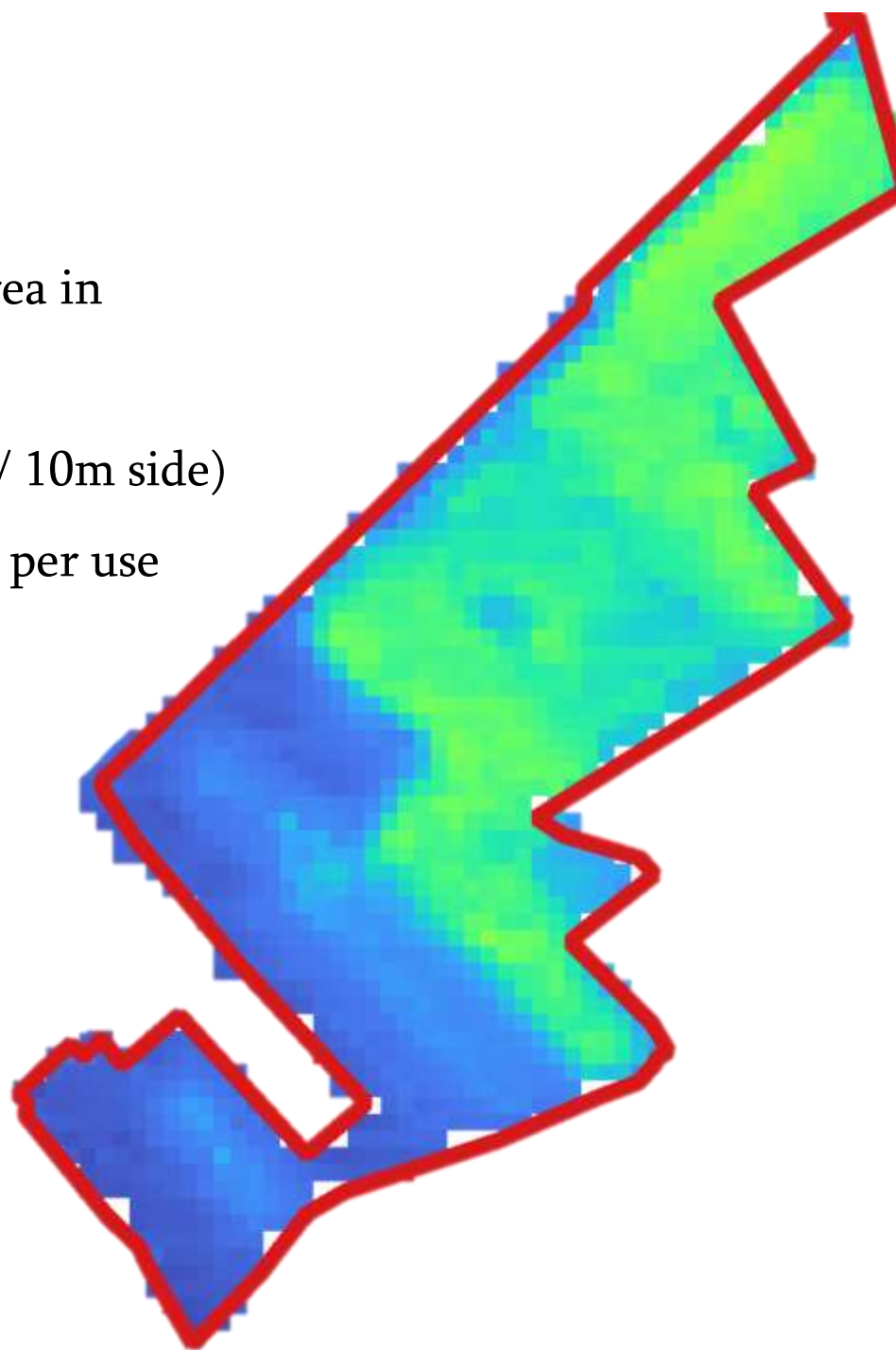
Comparison

Final output

What lies behind?

➤ Pixel VS parcel : subdivision of the area in units:

- Standard: pixel (square shaped w/ 10m side)
- Legally known: parcels (declared per use case)



Objective

Behind the scenes

Results

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Comparison

Final output

Results of the platform

Parameter of the CSH values per PARCEL	Value range
Coefficient of variation within the parcels	0 to 288%

Objective

Behind the scenes

Results

Trust

Comparison

Final output

Results of the platform

➤ Sidenote

- ❑ Filtering of extrapolated values ([0;250]mm range)

Parameter of the CSH values per PARCEL	Value range
Coefficient of variation within the parcels	0 to 288%
Parameter of the CSH values per PIXEL	Value range (mm)
Mean CSH values	49 to 67

Objective

Behind the scenes

Results

Trust

Comparison

Final output

Results of the platform

➤ Sidenote

- ❑ Filtering of extrapolated values ([0;250]mm range)

Parameter of the CSH values per PARCEL	Value range
Coefficient of variation within the parcels	0 to 288%
Parameter of the CSH values per PIXEL	Value range (mm)
Mean CSH values	49 to 67
Standard deviation CSH values	17 to 25

Objective

Behind the scenes

Results

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Comparison

Final output

Results of the platform

➤ Sidenote

- Filtering of extrapolated values ([0;250]mm range)

Parameter of the CSH values per PARCEL	Value range
Coefficient of variation within the parcels	0 to 288%
Parameter of the CSH values per PIXEL	Value range (mm)
Mean CSH values	49 to 67
Standard deviation CSH values	17 to 25
3rd quartile CSH values	<75

Objective

Behind the scenes

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Final output

Trustworthiness of the platform

➤ Descriptive statistics but *quid* of the accuracy of the description?

Range: seems logic

Actual values

➤ Collaboration with field actors: advisors

Basic ratched-based rising platemer

122 average parcels measurements of CSH

5 parcels

2019



Objective

Behind the scenes

Results

Trust

Comparison

Final output

Comparison of the results

	Validation	Platform prediction
Measurements	difference between total ratchet counts	Each record is directly translated into CSH

Objective

Behind the scenes

Results

Trust

Comparison

Final output

Comparison of the results

	Validation	Platform prediction
Measurements	difference between total ratchet counts	Each record is directly translated into CSH
Range over the year (mm)	45 to 213	0 to 250

Objective

Behind the scenes

Results

Trust

Comparison

Final output

Comparison of the results

	Validation	Platform prediction
Measurements	difference between total ratchet counts	Each record is directly translated into CSH
Range over the year (mm)	45 to 213	0 to 250
Root mean squared error - RMSE (mm)	20	35
Coefficient of determination - R ²	0.6 to 0.8	

- High value that indicates severe bias
=> Management advice is threatened

Objective

Behind the scenes

Results

Trust

Comparison

Final output

Digging deeper

➤ What parcels were poorly predicted ?

- ❑ Parcels w/ sub-parcel management not noted in the legal parcel declaration



Parcel w/ sub-parcel management

- ❑ e.g. Grazed today, grazed 3 days ago and mown
- ❑ Implication: heterogeneity of status

Objective

Behind the scenes

Results

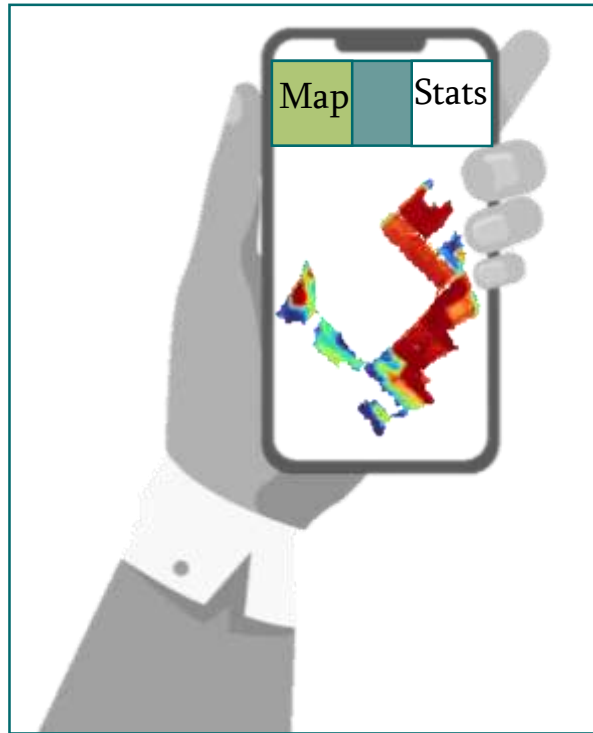
Trust

Comparison

Final output

Result:

Adapt the decision support system to help manage feed wedge



Made possible w/ pixel scale

Map	Parcel definition	Stats
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A screenshot of a web application interface. At the top, there is a green header with the text 'Select an area of interest' and window control icons. Below the header is a map of Belgium. On the left side of the map, there is a vertical toolbar with several icons: a plus sign, a minus sign, a house icon (highlighted with a red box), a location pin icon, a document icon, and a trash can icon. On the right side of the map, there is a red box containing the word 'Export'. The map shows various geographical features and labels, including 'België / Belgique / Belgien', 'Charleroi', 'Liege', 'Wallonie', and 'Parc Naturel Viroin-Hermeton'. At the bottom of the map, there is a footer with the text 'Leaflet | Data by © OpenStreetMap, under ODbL.'

Objective

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Comparison

Final output

Working scale ?

- Parcel
 - Great to let live the cattle on its own
 - Not flexible
- Pixel
 - Increased flexibility
 - New opportunity for pasture management simulation for rotational grazing

And concretely?

- Fragmented parcels and further apart

Take home
message

Thank you for your attention

Questions?

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Thanks to our partners



Thanks to the walloon
Region for funding the
ROAD-STEP project

