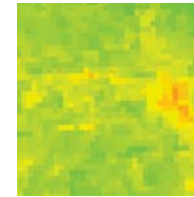


Assessment of AquaCrop for maize and winter wheat using satellite derived fCover data

27-29 June 2017 – Bruges – Belgium
 19th International Workshop on the Analysis of Multitemporal Remote Sensing Images
 Hamid SALLAH & Joost WELLENS



... « back to the future »
 - and beyond -

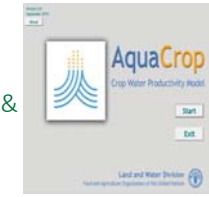


↗ temporal resolution;
 ↘ spatial resolution;
 Composited images.



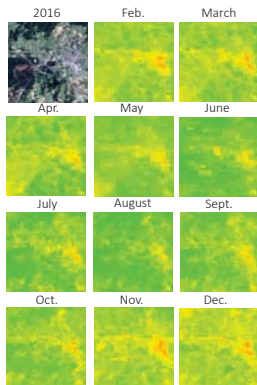
↗ temporal resolution;
 ↗ spatial resolution;
 Composited images.

&

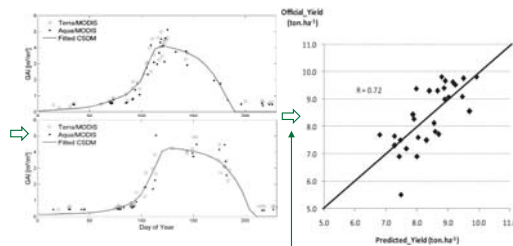


Crop growth model

1 Regional (coarse) crop monitoring - curve fitting -



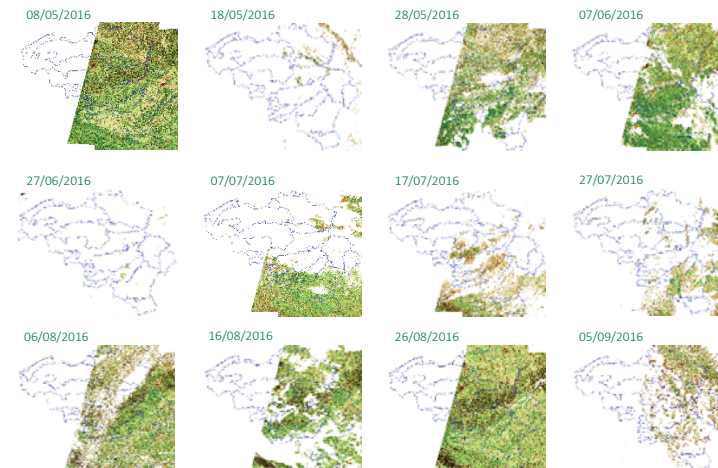
- MODIS;
 - GAI temporal profiles.
 ('green area index')



Shape of decreasing curve
 of green area index

Regional wheat yield
 (L. Kouadio et al., 2012)

2 Regional (detailed) crop monitoring - 10-daily data ? -



(I. Piccard et al., 2016)

3.i AquaCrop (FAO)

- filling the gaps and more -

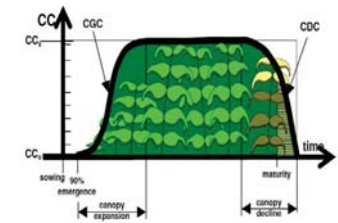
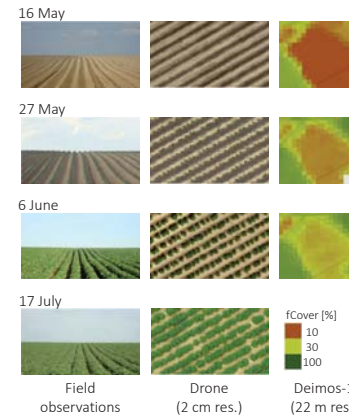


- 'Conservative' crop-file;
- Field level;
- Root and tuber crops;
- Fruit/grain producing crops;
- Leafy vegetable crops.

Calibration / Validation:
minimise observations ↔ simulations
(fCover & biomasse)

3.ii AquaCrop

- a model can 'see daily' -



Graph: - evolution;
- canopy growth & decline;
- phenological stages.

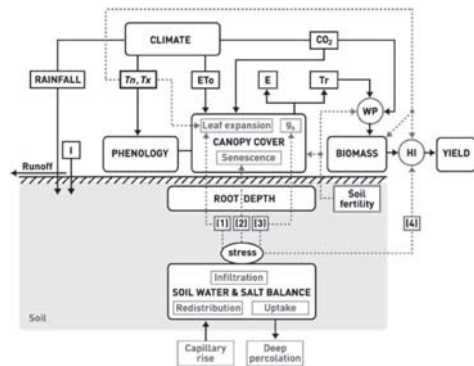
3.iii AquaCrop

- a model can 'see further' -

simple & solid

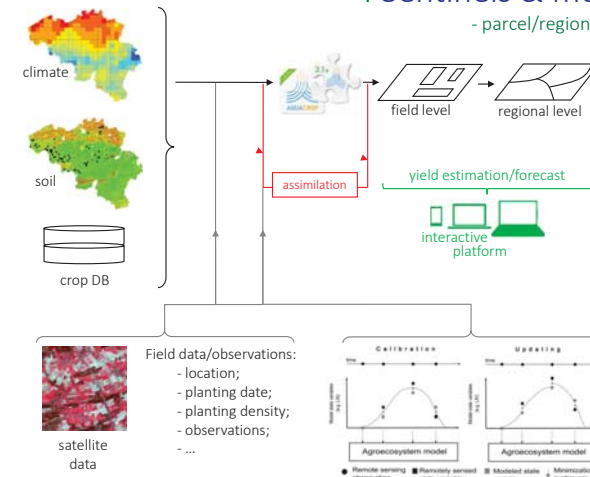
$$B = WP \cdot \sum Tr \text{ or } \text{Biomass} = \text{Water productivity} \cdot \text{Sum of transpiration}$$

$$Y = HI \cdot B \text{ or } \text{Yield} = \text{Harvest index} \cdot \text{Biomass}$$

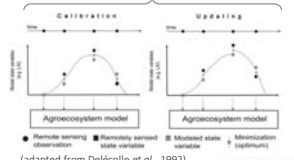


4 Sentinels & models

- parcel/regional level -



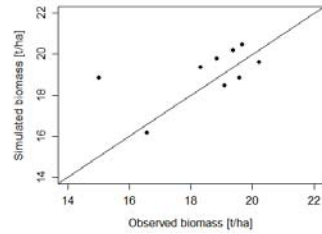
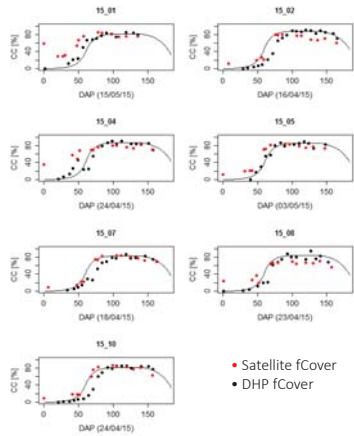
- Field data/observations:
- location;
 - planting date;
 - planting density;
 - observations;
 - ...



(adapted from Delécolle et al., 1992)

5.i First results

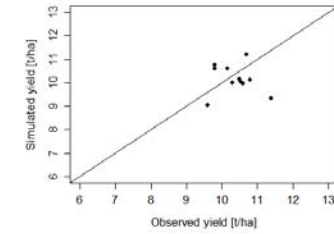
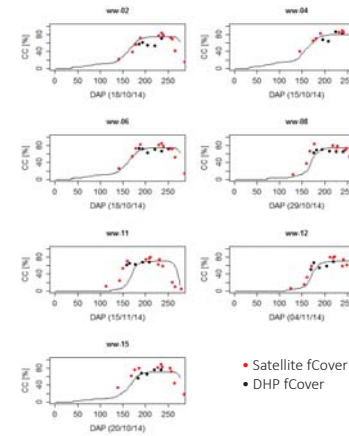
- maize (2015) -



- Impact of emergence date?
- Impact of variety?
- Late anti-herbicides application
- RMSE = 1.50 ton/ha

5.ii First results

- winter wheat (2015) -



- Impact of emergence date?
- RMSE = 0.84 ton/ha

6 Some references

- ongoing projects/research -

: maize, winter wheat and potatoes;

: wheat and sugar beet;

: rice and sugar cane;

: durum wheat;

: sorghum.

- fertilizer impact;
- emergence date retrieval;
- ...

Thank you!

www.eed.ulg.ac.be



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M.T. Sali, H. Sallah, K., Sossey,
J. Wellens, F. Zouhir.