



**Ministry of Environment
and Food of Denmark**
The Danish
Agricultural Agency

Sen4CAP: Application and evaluation in Denmark



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Contents

- Overview of the Danish CAP monitoring system
- Application of Sen4CAP in DK
- Initial Sen4CAP case study: maize harvest analysis 2019
- Conclusion



Overview of the Danish CAP monitoring system (I)

Integrating 2 types of satellite measurements

Sentinel 1 Structural changes in land cover (SAR signal)



Sentinel 2 Changes in vegetation indices (multispectral optical instrument)



Overview of the Danish CAP monitoring system (II)

CAP monitoring in DK 2020



Crop Classification



Ploughing



Mowing/grazing



Additional cases for satellite analysis

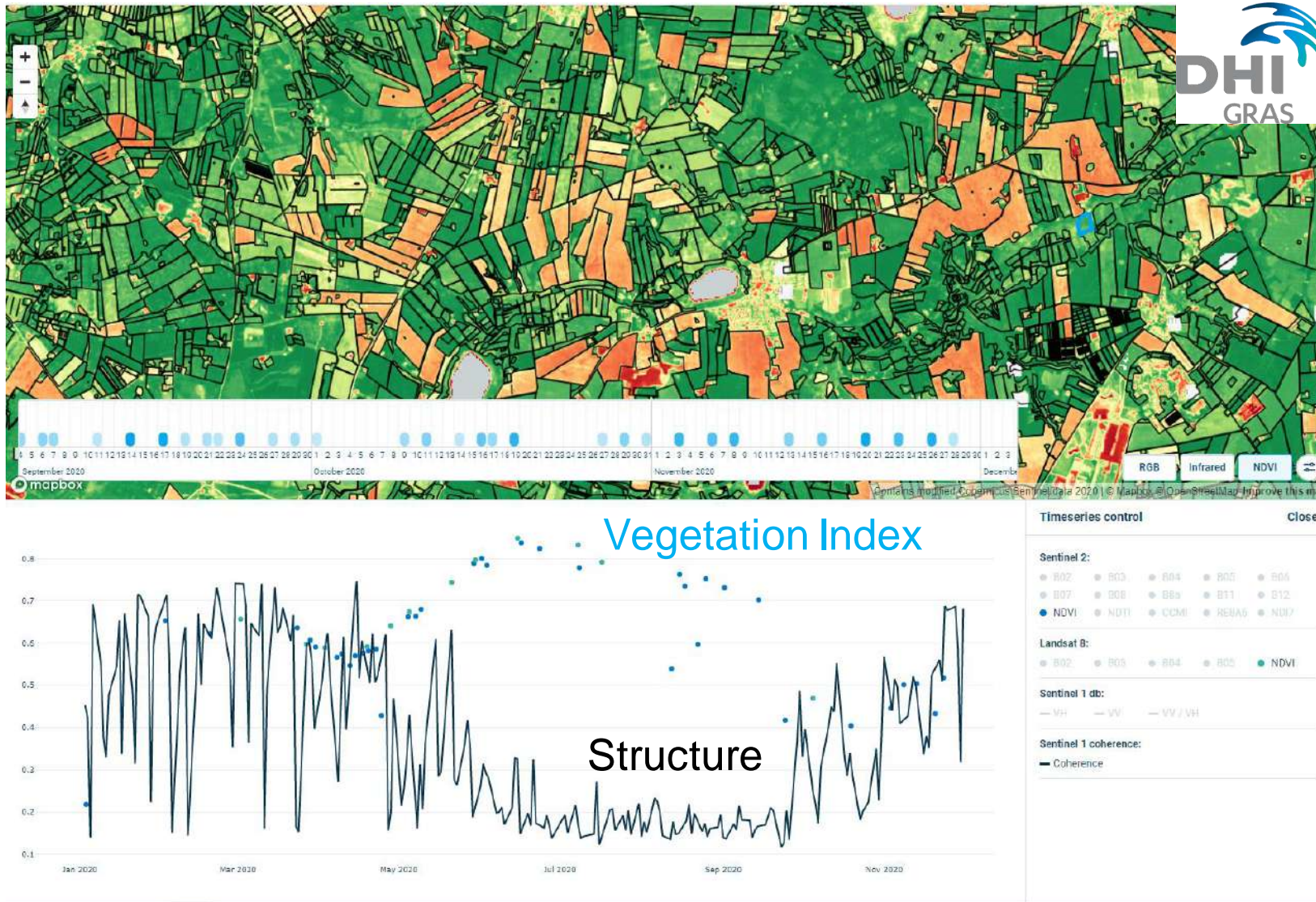
- **Catch crops classification**
- **Maize harvest**

Non-compliance Classification



Overview of the Danish CAP monitoring system (III)

Example from Web Viewer supplied by DHI GRAS



Applications of Sen4CAP in DK

Sen4CAP assessment 2021

- **Maize harvest**
- **Tillage detection**

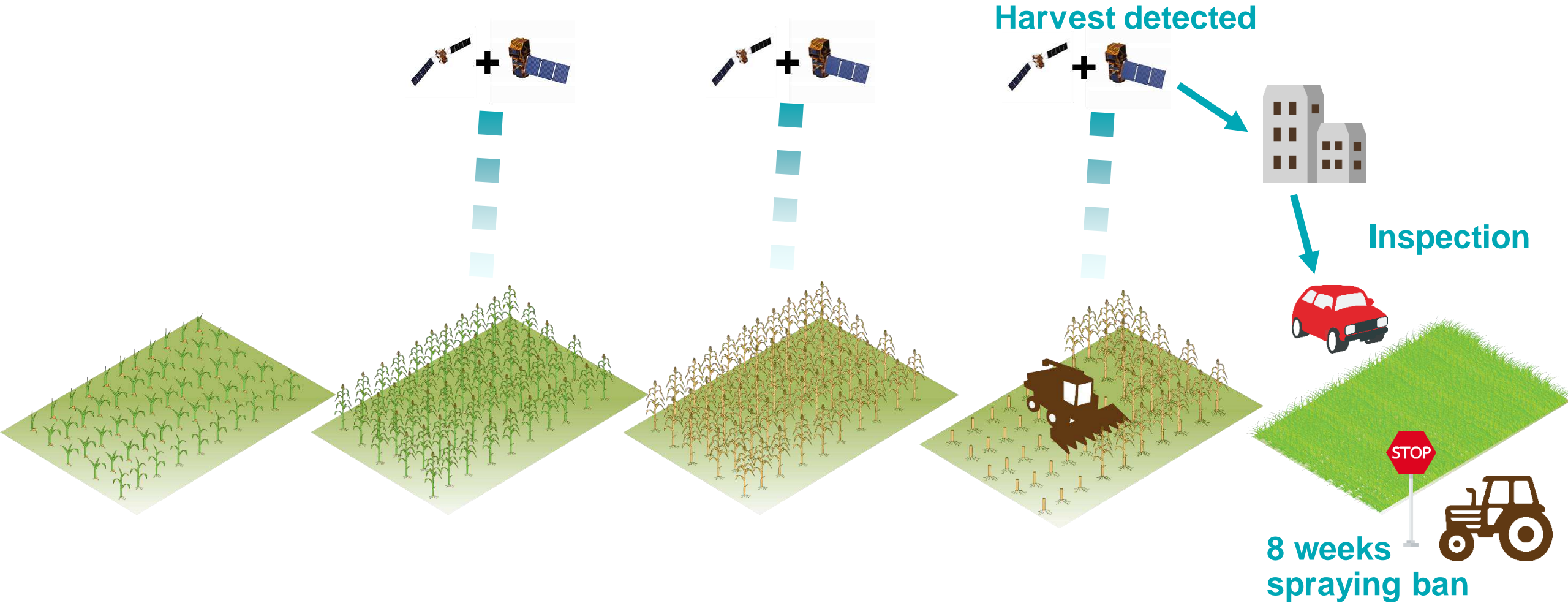
Future applications of Sen4CAP

- **Crop classification**
- **EFA practices**
- **Detection of mowing and grazing**
- **Marker database**



Initial case study: maize harvest analysis 2019 (I)

How are the maize harvest results used by the Danish Agricultural Agency?



Initial case study: maize harvest analysis 2019 (II)

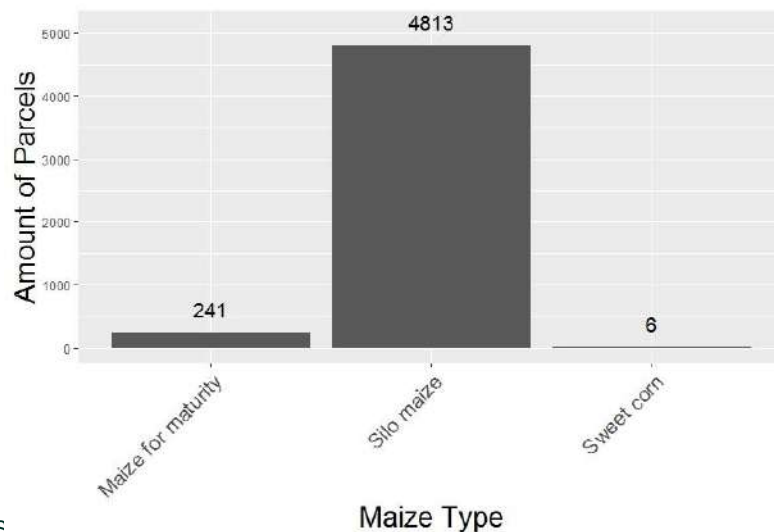
Area of interest: Sentinel-2 tile (VNH)

Input: parcels, declared with maize crop codes

Used module: L4C (EFA-practices)

Analysis was run three times in the season:
3rd, 15th & 30th of October

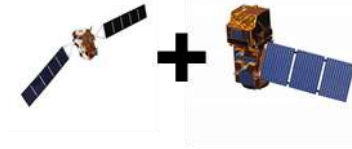
1/6 of all maize parcels in 2019 was analysed



Initial case study: maize harvest analysis 2019 (III)

Results
30-10-2019

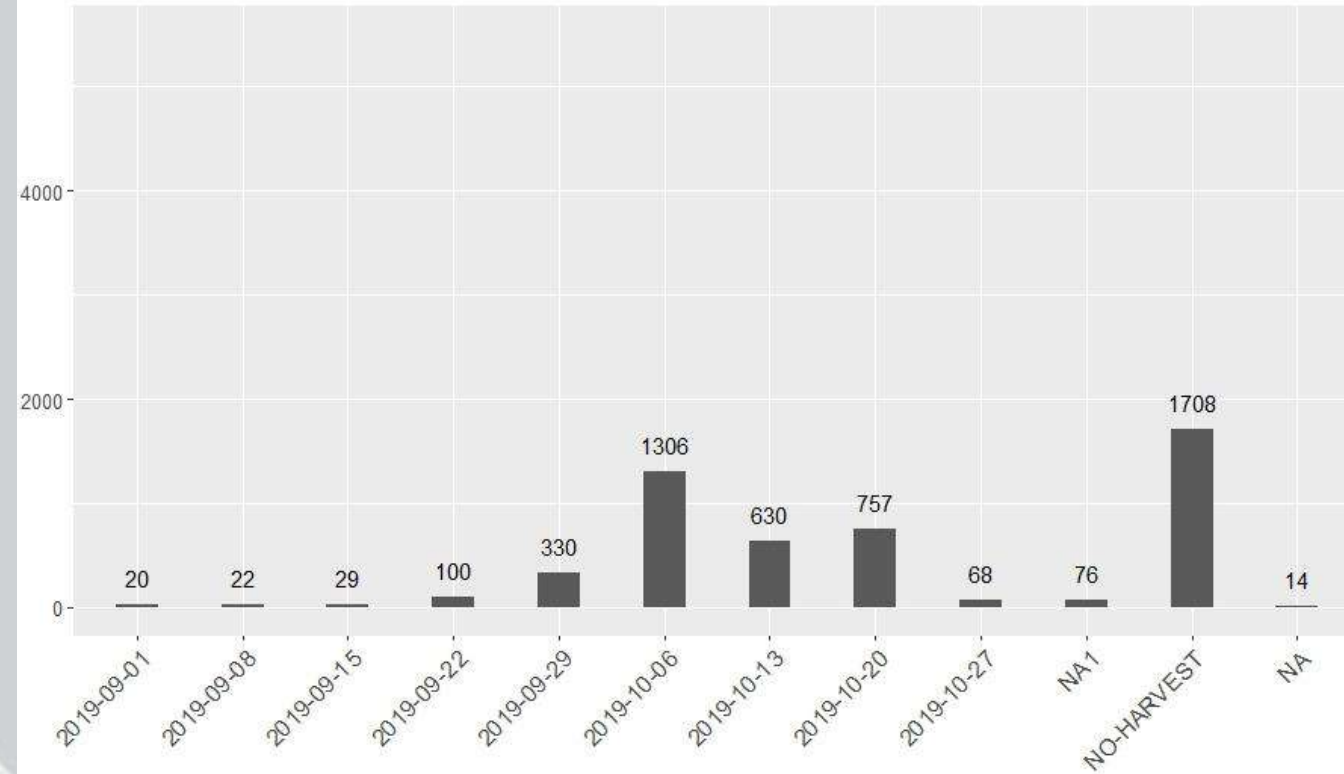
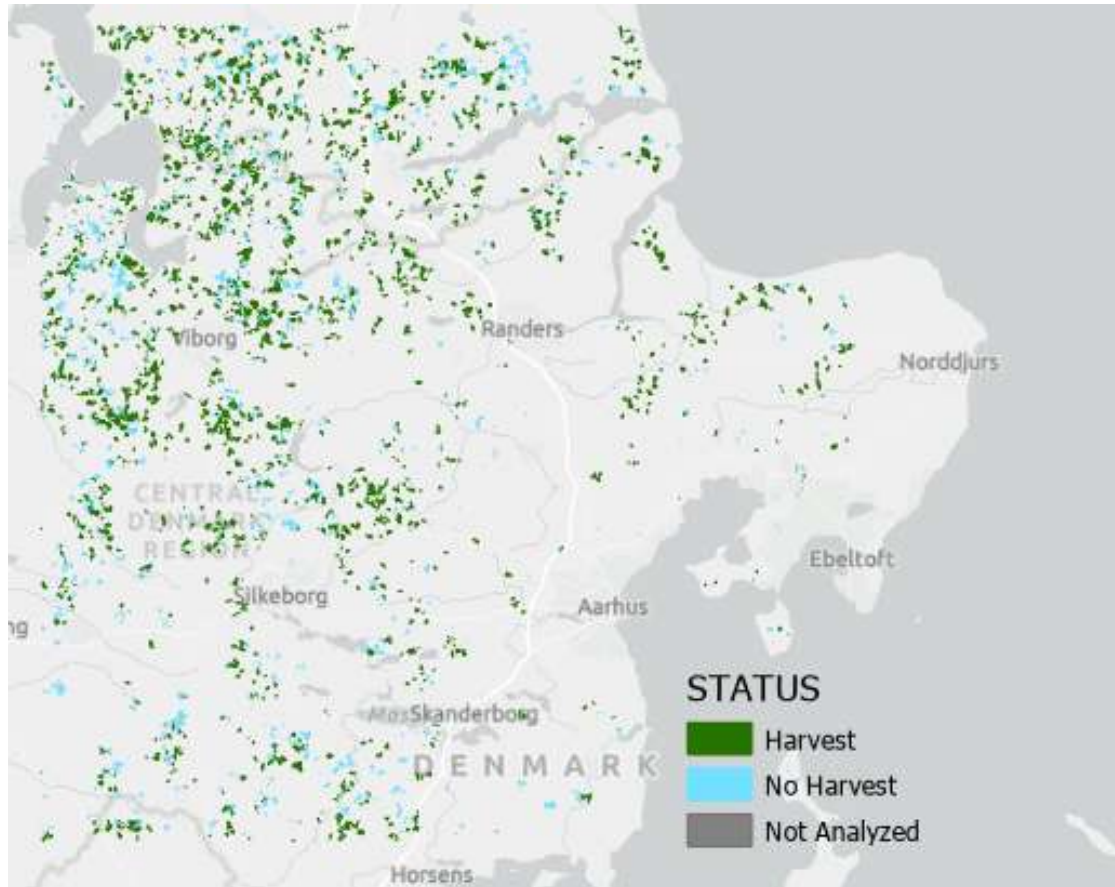
...based on Sentinel-1 & 2



3rd of October

15th of October

30th of October



Initial case study: maize harvest analysis 2019 (IV)

Quality Assessment of the Results



...based on Sentinel-1



		Sen4CAP			Producer's accuracy
		Harvest	No harvest	Total	
Road side observations	Harvest	207	6	213	97%
	No harvest	4	6	10	60%
	Total	211	12	223	
User's accuracy		98%	50%		

...based on Sentinel-1 & 2



		Sen4CAP			Producer's accuracy
		Harvest	No harvest	Total	
Road side observations	Harvest	158	55	213	74%
	No harvest	0	10	10	100%
	Total	158	65	223	
User's accuracy		100%	15%		

Implementation of Sen4CAP in DK

Improvements with Sen4CAP

- **Useful for individual tasks such as catch crop and maize harvest, which are not part of the automated setup in DK.**
- **Free to download and to use, with a non-commercial, well documented and transparent set-up.**
- **Wide network to share experiences and exchange knowledge with.**

Challenges

- **Currently difficult to integrate with the automated setup for monitoring in DK.**
- **Reliance on Sen4CAP creates dependency outside the jurisdiction of the Danish Agricultural Agency.**
- **Concerns with open source. Modules are maintained/upgraded, but not developed further.**



CAP monitoring in DK 2020

