TMG Dronity

References

References in the field:

- Automotive industry
- Petroleum industry
- Cement production
- Construction companies
- Agricultural sector
- Surveying companies
- Security and forensic companies
- Police
- Municipalieties
- Property owners

Countries:

- Slovakia
- Germany
- Czech republic
- Romania
- Brasil
- Russia
- Argentina
- Ukrain
- Turkey
- Spain
- USA
- Peru
- ...

References


Slovnaft


PEUGEOT


ŠKODA


Holcim


ČESKOMORAVSKÝ
CEMENT
HEIDELBERGCEMENT Group


Continental


OPTERRA
A CRH COMPANY


Cement Hranice


LafargeHolcim


cargo-partner


CRH


YIT


GENERALI


ZMOP
spol. s r.o.


GIB


ACREA
ARCHITECTURE · PLANNING


Doprastav


NÁRODNÁ
DIAĽNIČNÁ
SPOLOČNOSŤ


KP


ZSE


IMMOCAP
PROJECT FOR LIFE


MINISTERSTVO
VNÚTRA
SLOVENSKEJ REPUBLIKY


METROPOL
SLOVAKIA

TMG Dronity

PRECISE AGRICULTURE

WITH
DRONES and SATELLITES

RNDr. Pavol Kunovský
Programmer, Software Engineer

WE HAVE 3 main PRODUCTS

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What we are doing?

- Professional pilot crews
- Drone scanning of plants/fields
- Multispectral data capturing

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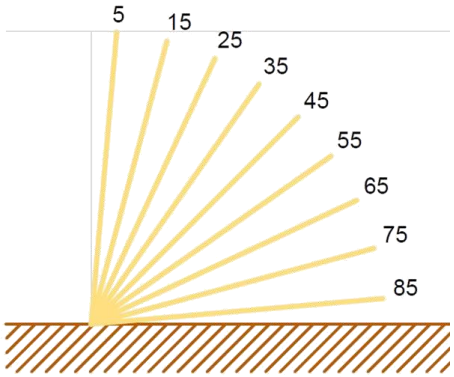
What we are doing?

- Professional pilot crews
- Drone scanning of plants/fields
- Multispectral data capturing

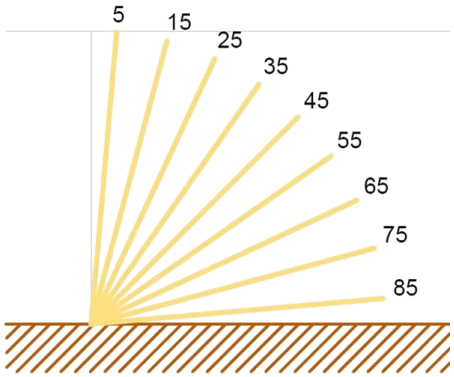


- Patent for lodging measurement
- Accepted by insurance companies
- Payment tool for insurance companies

TMG Dronity

What we are doing?

- Professional pilot crews
- Drone scanning of plants/fields
- Multispectral data capturing



- Patent for lodging measurement
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AGRO INSPECTOR

- Worldwide analytic tool AGRO - Inspector
- Business site: www.agro-inspector.com
- Data analysis

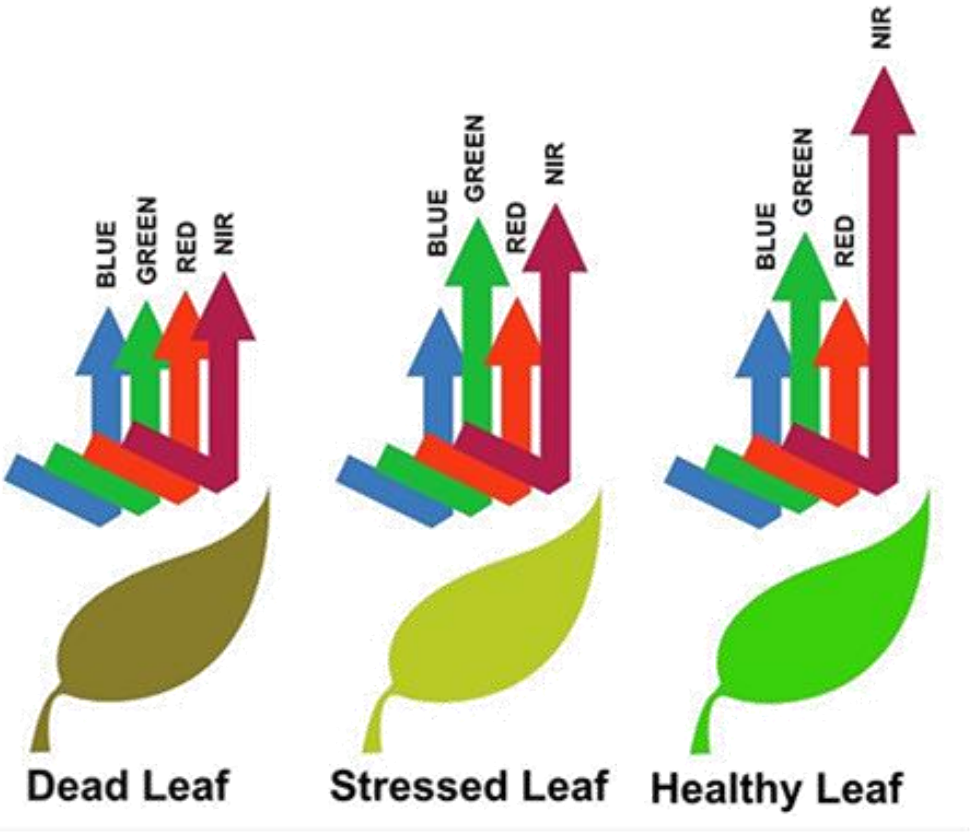
1.

- Professional drone pilot crews
- Drone scanning of plants/fields
- Multispectral data capturing
- Graud field data capturing

A little of theory ?

How to find out the vegetation index

- We are capturing visible and non-visible wave lenght from leafs
- We are calculating vegetation index (NDVI, GNDVI, EDRE, GNDRE)



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How to find out the vegetation index

Healthy

Stressed

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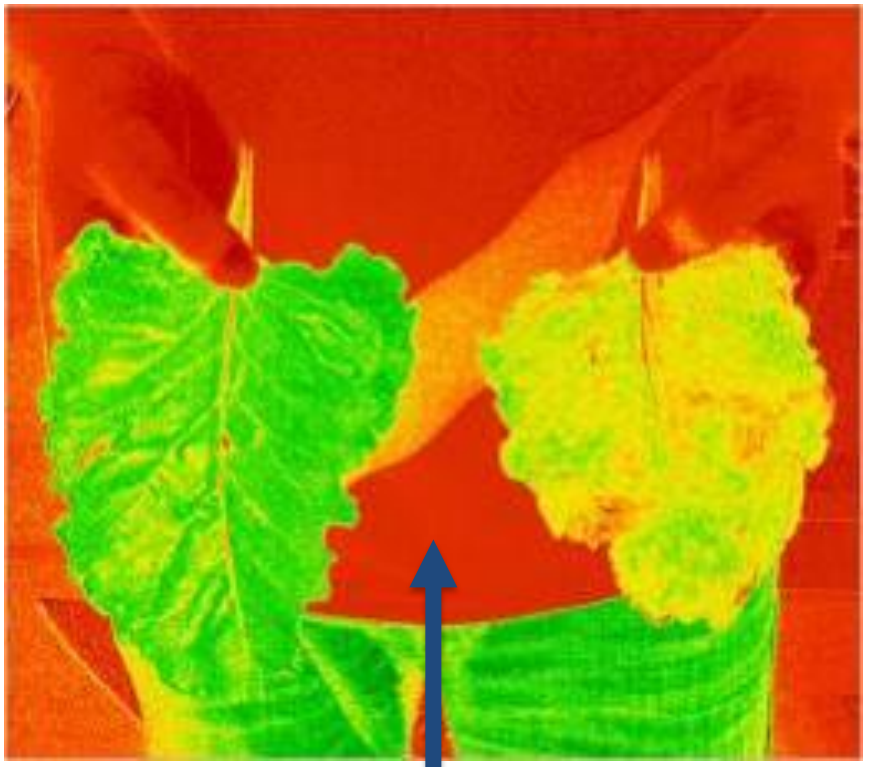
How to find out the vegetation index



Healthy

Stressed

Result from captured data

How to find out the vegetation index

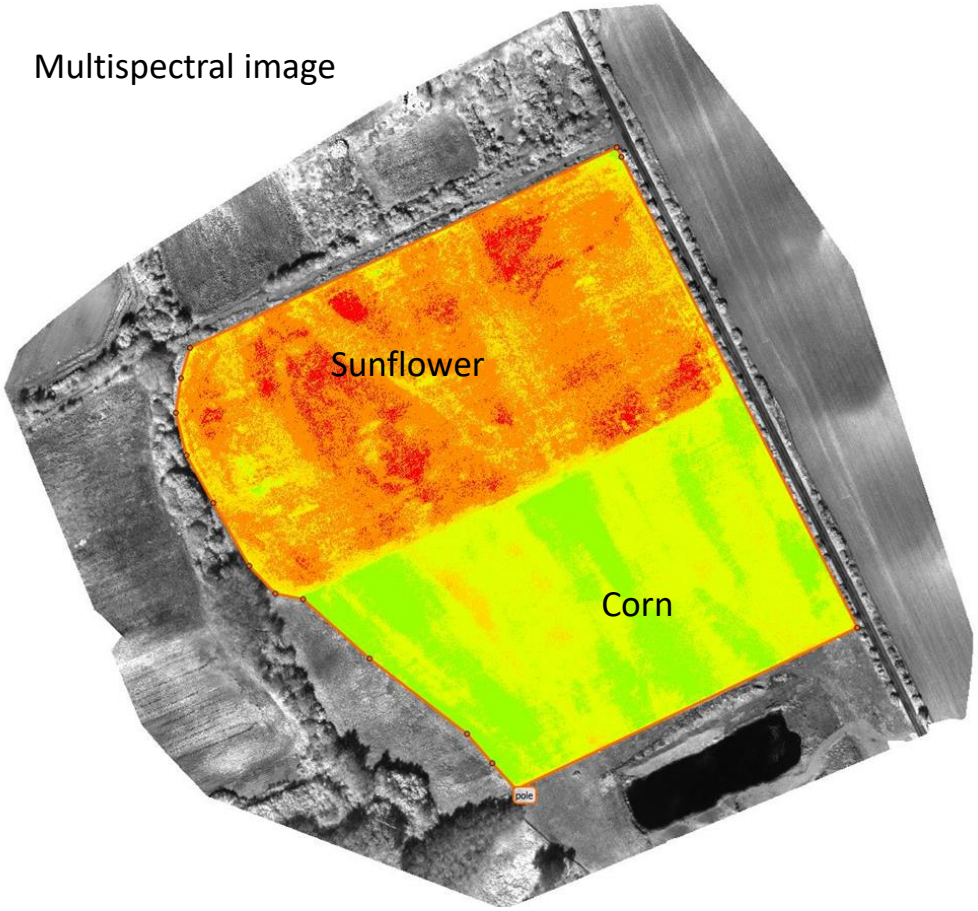
A little of PRAX ?

DRONE CAPTURING DATA FOR NDVI Index

NDVI index - main vegetation index - health and vitality of crops

RGB image

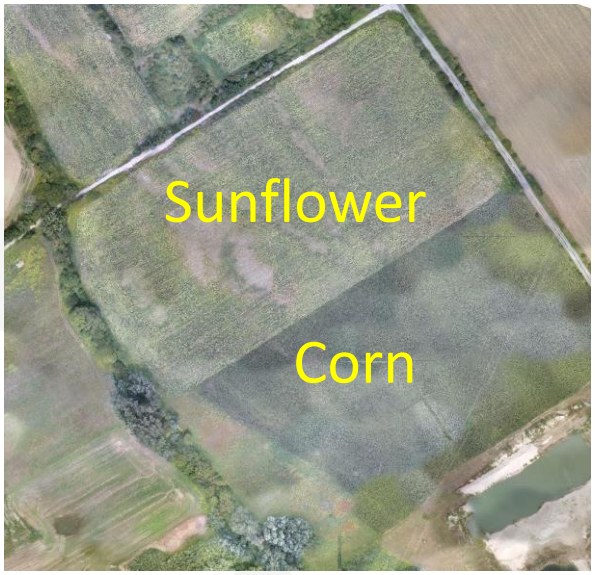
Multispectral image

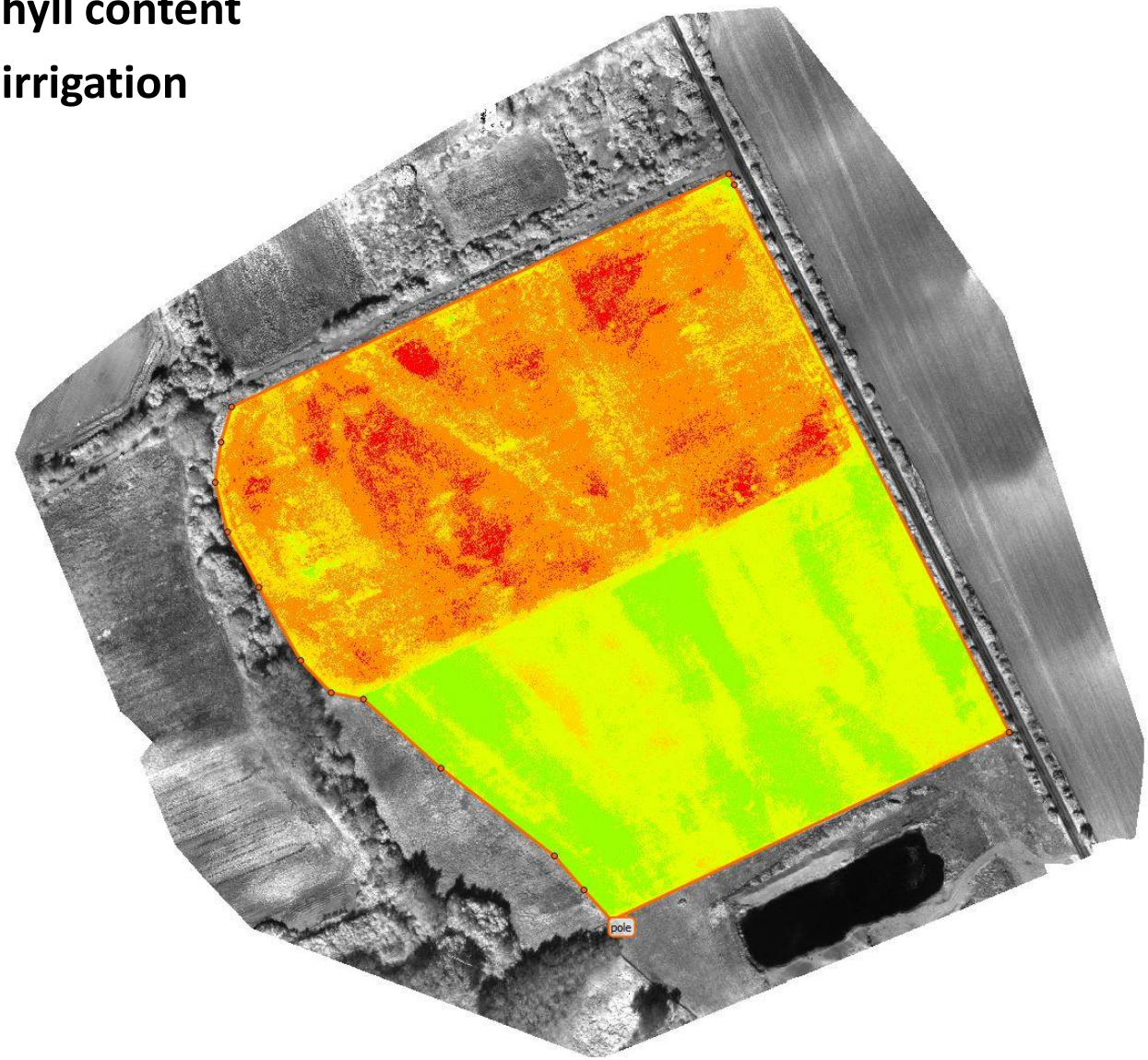


DRONE CAPTURING DATA FOR GNDVI Index

Sensitive index to chlorophyll content

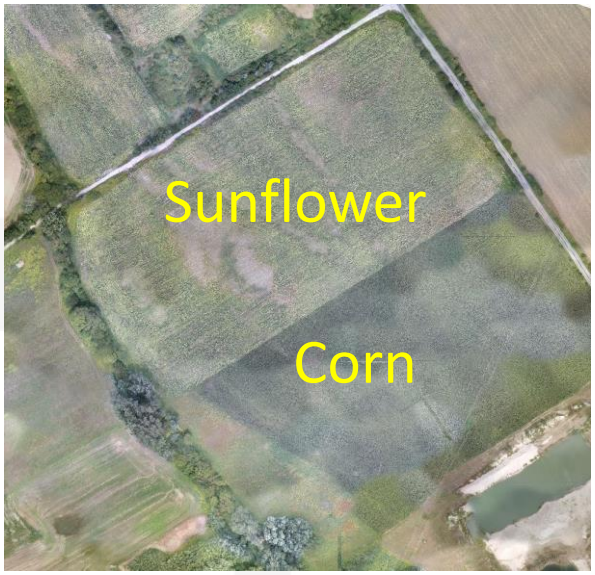
Used to optimalization of irrigation

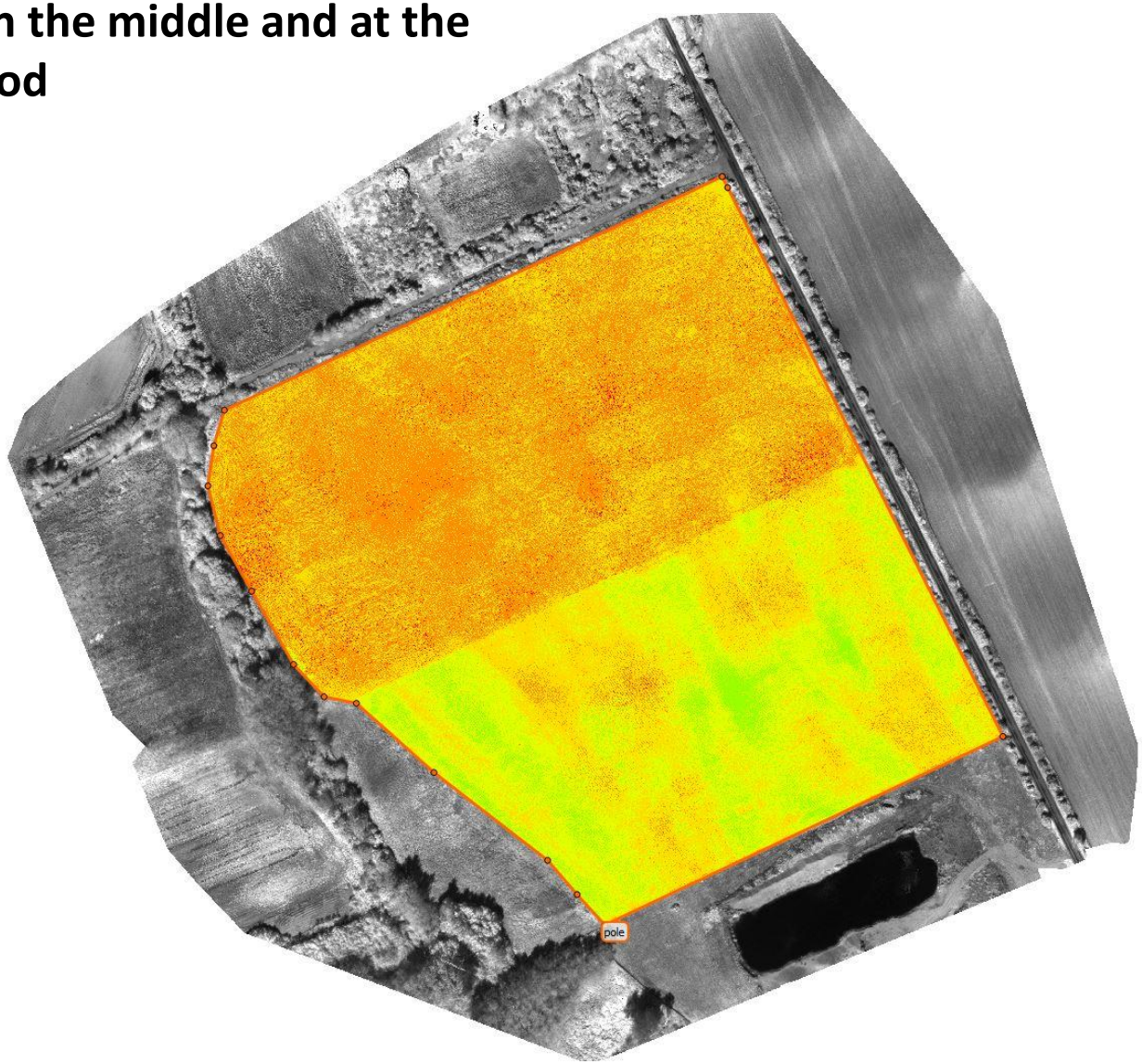




DRONE CAPTURING DATA FOR NDRE Index

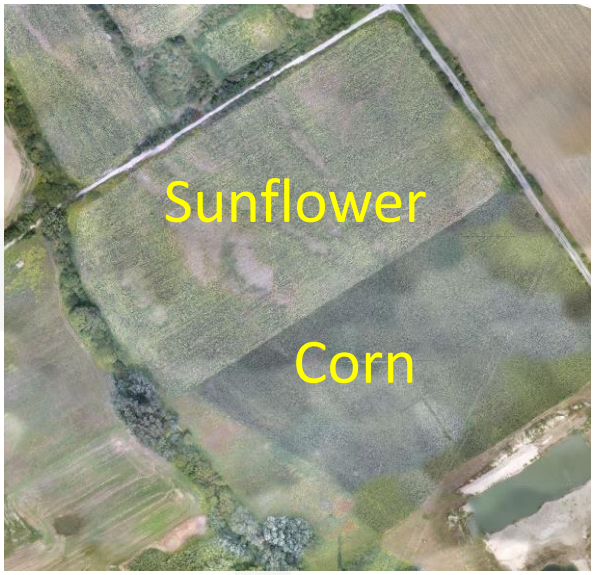
Health indicator of crops in the middle and at the end of the vegetation period

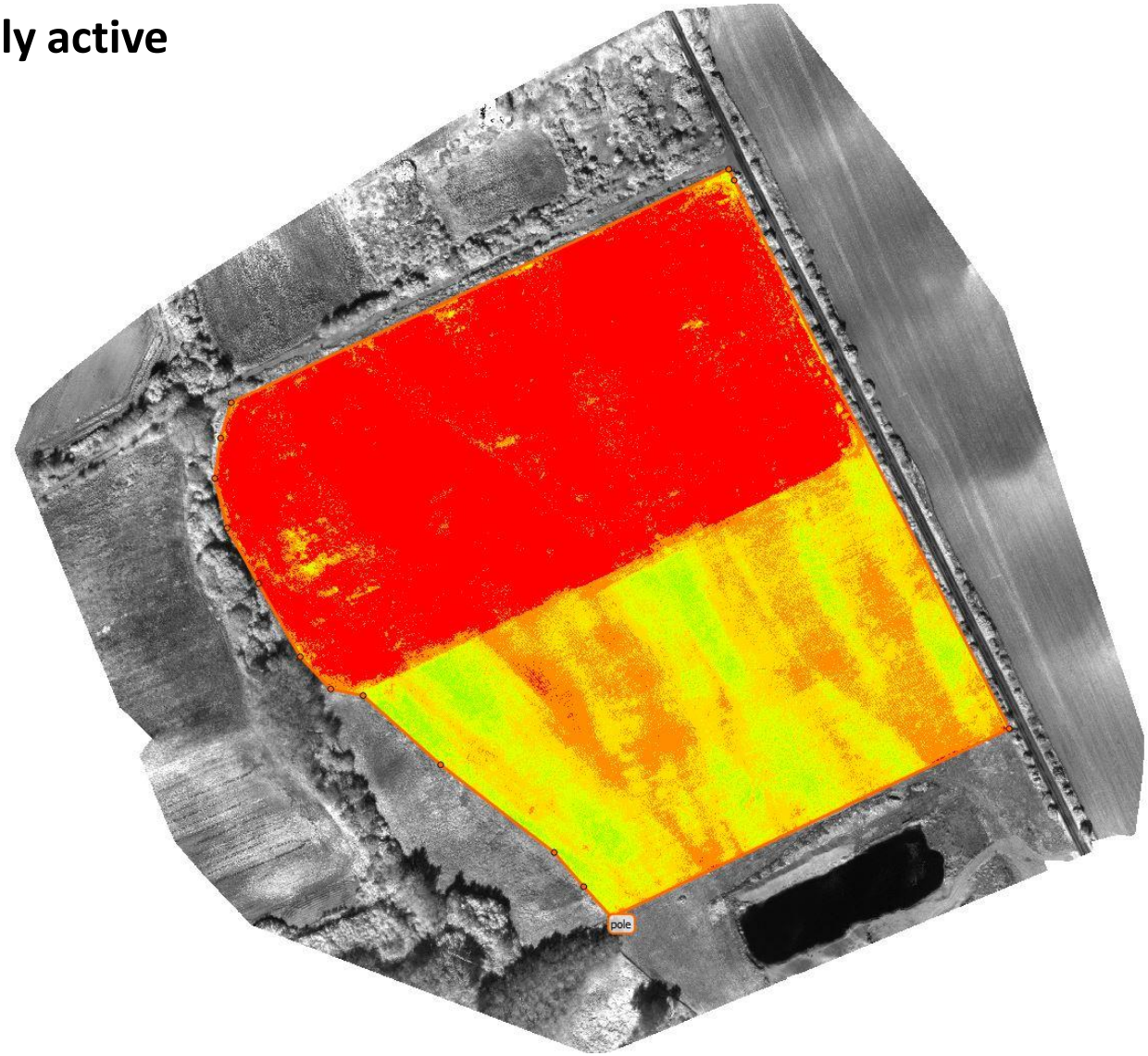




DRONE CAPTURING DATA FOR GRVI Index

It shows photosynthetically active biomass in plants





Optimalisation of fertilisation

NDVI + GNDVI + NDRE + GRVI

Optimalisation of fertilisation

NDVI + GNDVI + NDRE + GRVI

Optimalisation of fertilisation

NDVI + GNDVI + NDRE + GRVI

RESULTS FOR AGRONOMIST

Optimalisation of fertilisation

NDVI + GNDVI + NDRE + GRVI

RESULTS FOR AGRONOMIST

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Optimalisation of fertilisation

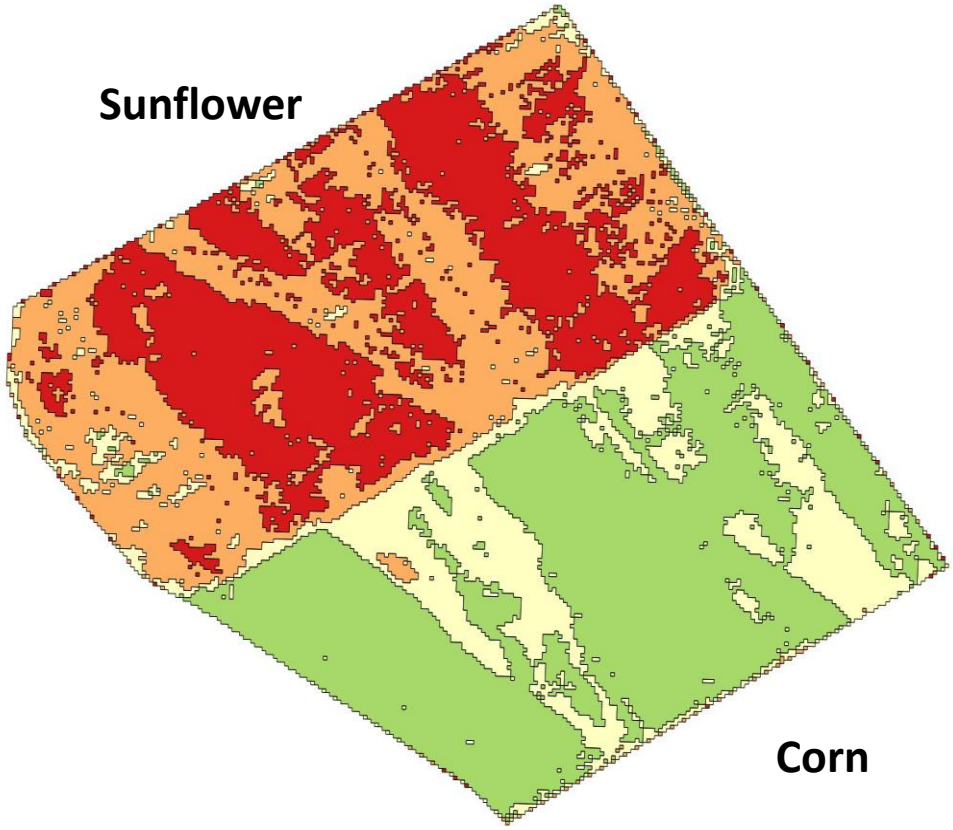
NDVI + GNDVI + NDRE + GRVI

RESULTS FOR AGRONOMIST

Reduce fertilizer consumption - increase of crop

Optimalisation of fertilisation

How to save the nitrogen with this methodology ?



Example:
Legend of applied nitrogen
(f.e. l/ha, kg/ha,...)

Batch	Area	Area	Amount
[l/ha, kg/ha,...]	[ha]	[%]	[kg]
110	4,20	33,92	462,42
120	2,00	16,15	240,22
140	3,04	24,54	425,73
160	3,15	25,38	503,29
		Σ	1631,65

It really WORKS !!

International project

International project
„Aerial monitoring of crops – rape seed and wheat“

Ocealia
UNE AGRICULTURE D'AVANCE

- Some EU countries
- Field with rape oil - 24 000 hectars
- Field with wheat – 10 000 hectars
- Period – 2014 – 2016
- Project goal: application of **recommendation for fertilization**

Rape seed

- **Average crop of rape seed / 1 hectar – 2016**

After application of the recommendation for fertilization:

Applied nitrogen about 34 kg/ha less like normally
Average increase crop of 0,5 t/ha

	Applied LESS fertilizer than recommended	Applied the recommendation for fertilization	Applied MORE fertilizer than recommended
Average crop (t/ha)	3,24	3,73	3,51

Source: AIRINOV / OCEALIA

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Increased profit

- **Return of investment on rape seed for 3 years**

+ 320 €/ha profit

+ 320 000 € / 1000 ha profit

	2014	2015	2016
Saved nitrogen fertilizer	- 36 U **+ 36 €**	- 17 U **+ 17 €**	- 34 U **+ 34 €**
Increased crop	+ 0,3 T/ha (x280 €/ha) **+ 84 €**	+ 0,13 T/ha (x325 €/ha) **+ 42 €**	+ 0,49 T/ha (x310 €/ha) **+ 152 €**
Average cost for project	- 15 €	- 15 €	- 15 €
Profit / ha	**+ 105 €/ha**	**+ 44 €/ha**	**+ 171 €/ha**

Source: AIRINOV / OCEALIA

Wheat

- **Average crop of wheat / 1 hectar – 2016**

After application of the recommendation for fertilization:

Applied nitrogen about 13 kg/ha more like normally

Average increase crop of 0,32 t/ha

	Applied LESS fertilizer than recommended	Applied the recommendation for fertilization	Applied MORE fertilizer than recommended
Average crop (t/ha)	6,24	6,56	6,11

Source: AIRINOV / OCEALIA

Increased profit

- **Return of investment on wheat for 3 years**

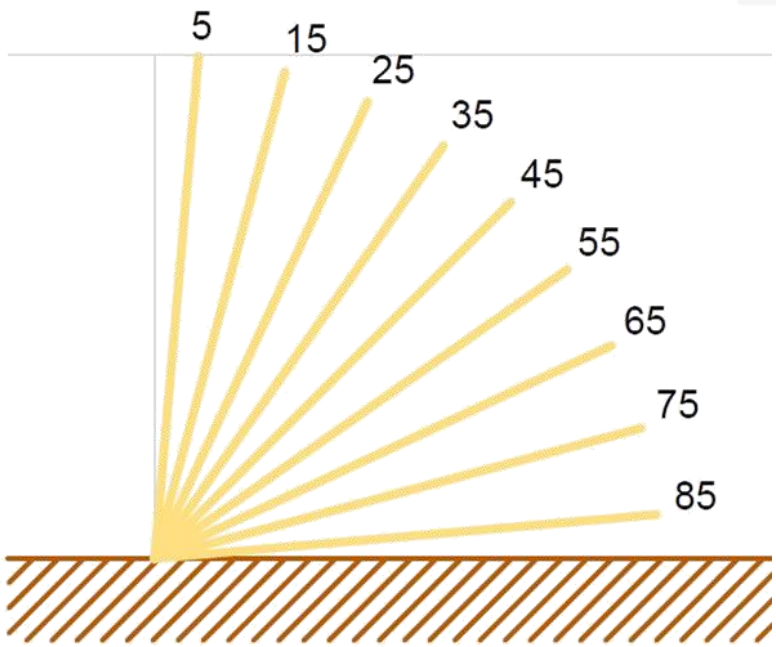
+ 265 €/ha profit

+ 265 000 € / 1000 ha profit

	2014	2015	2016
Saved nitrogen fertilizer	-10 U **+ 10 €**	-7 U **+7 €**	-13 U **+ 13 €**
Increased crop	+ 0,75 T/ha (x140 €/ha) **+ 105 €**	+ 0,8 T/ha (x150 €/ha) **+ 120 €**	+ 0,32 T/ha (x125 €/ha) **+ 40 €**
Average cost for project	- 10 €	- 10 €	- 10 €
Profit / ha	**+ 105 €/ha**	**+ 117 €/ha**	**+ 43 €/ha**

Source: AIRINOV / OCEALIA

2.

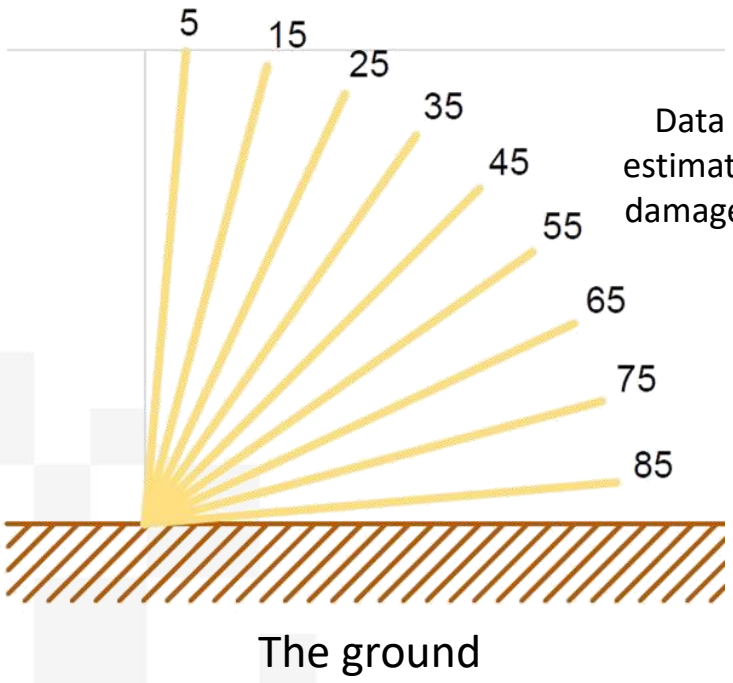


- International Patent
- Tool for lodging measurement
- Accepted by insurance companies
- Payment tool for insurance companies

Lodging of plants

Our patent for lodging measurement - what do we measure?

Lodging of plants in degrees



Data used as basis for estimation process during damage event like stormy weather

Level of lodging	Lodging from vertical position in degrees	m2
9	5	?
8	15	?
…	…	…

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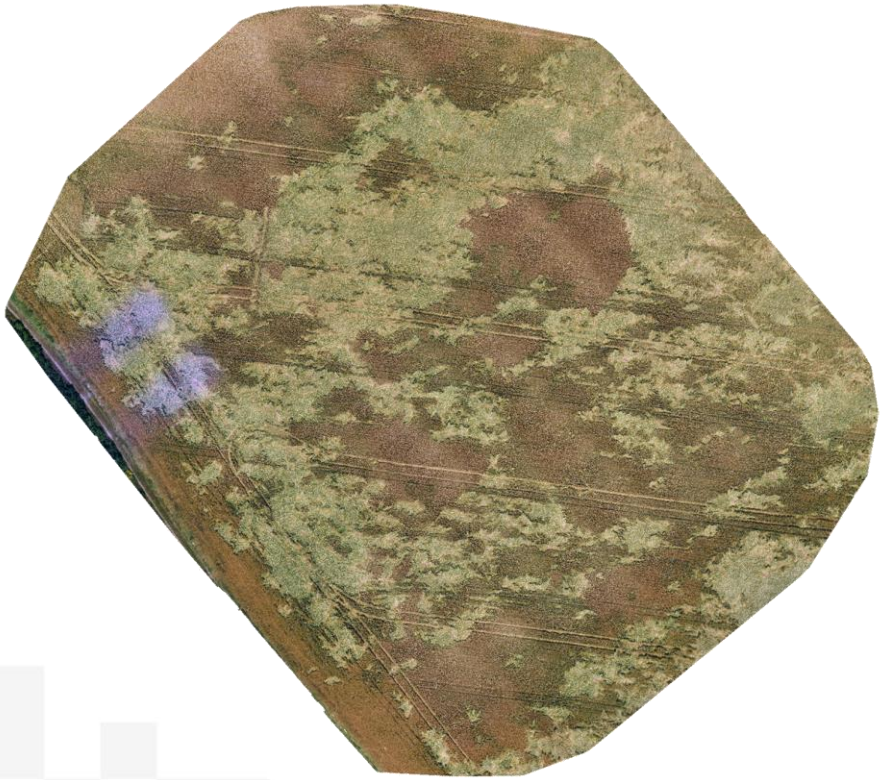
Map of lodging

Exact measurements of the area for each level of lodging

RGB map

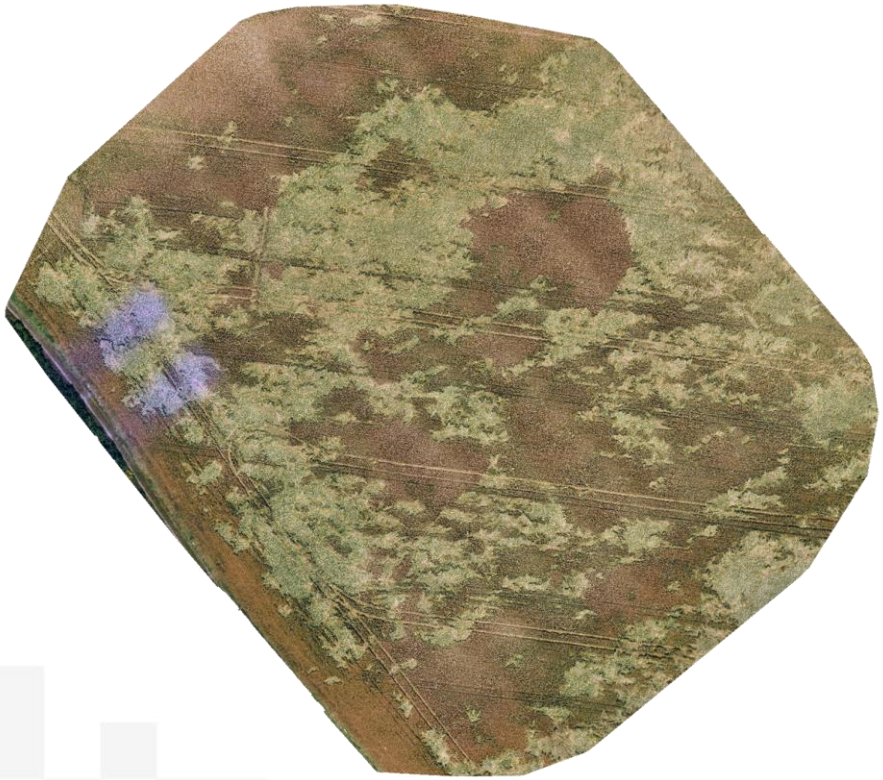


TMG Dronity

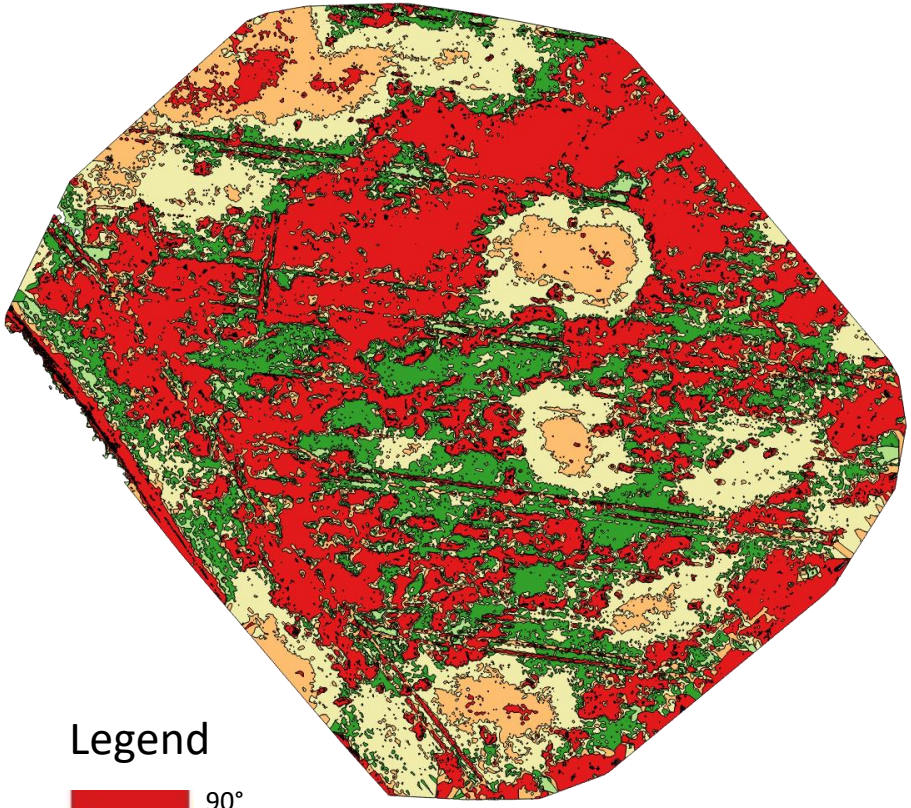
Map of lodging

Exact measurements of the area for each level of lodging

RGB map



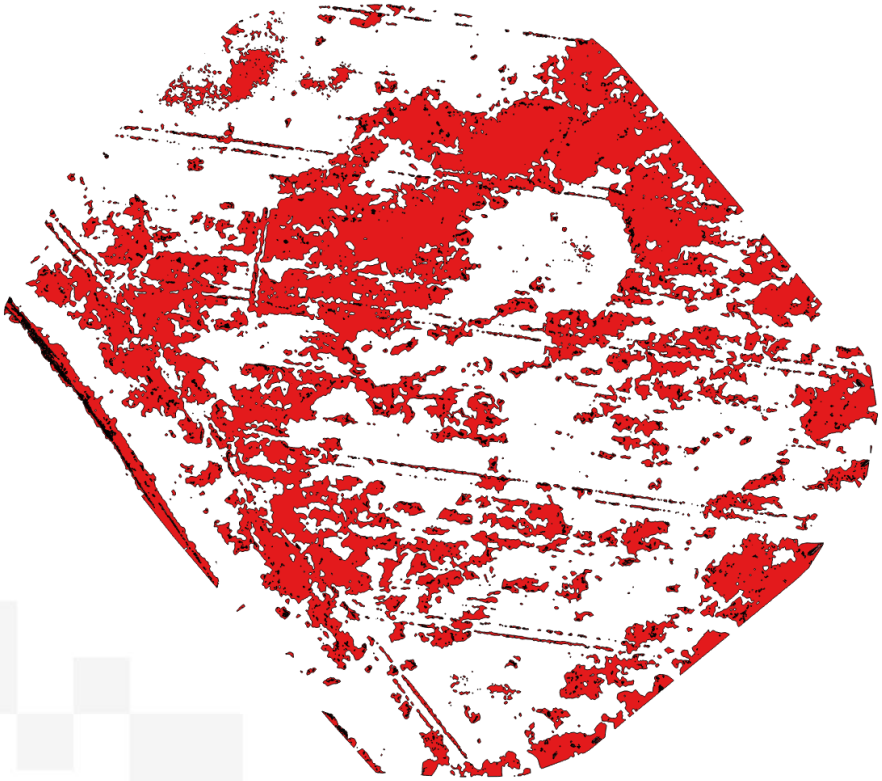
Map of lodging



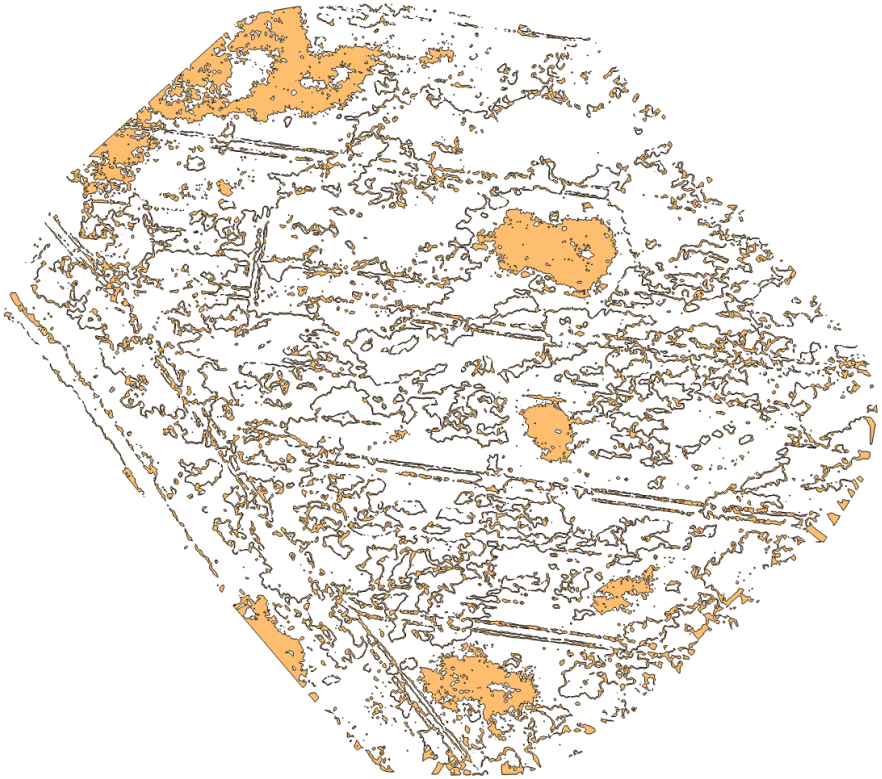
TMG Dronity

Map of lodging

Lodging: 90°
Area: 9035.03 m2



Lodging: 75-90°
Area: 4324.39 m2



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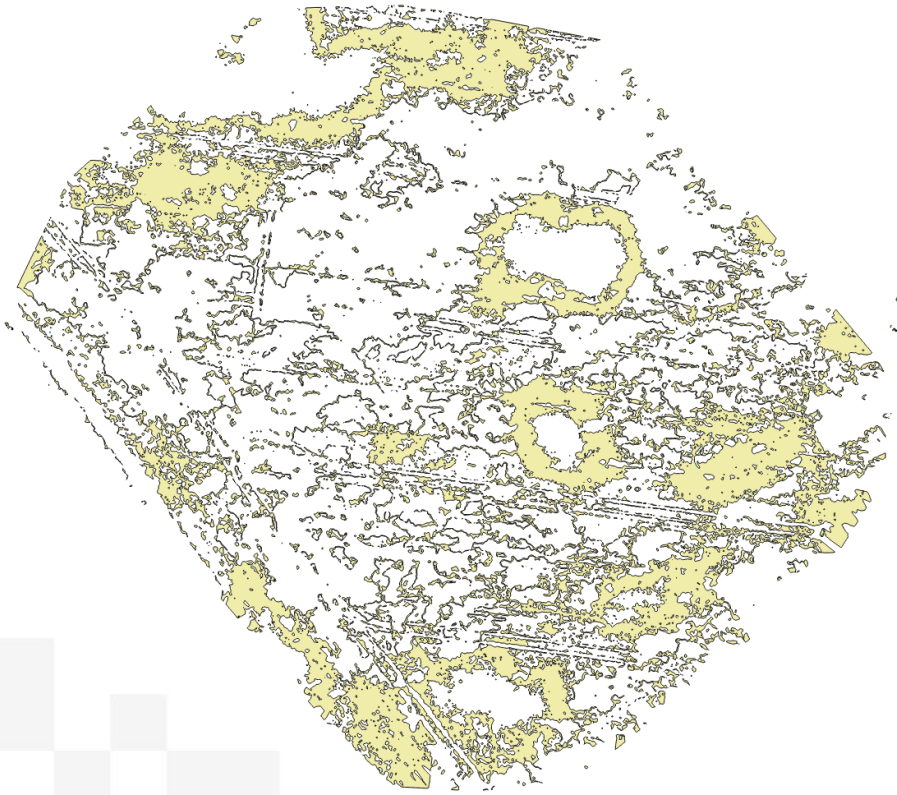
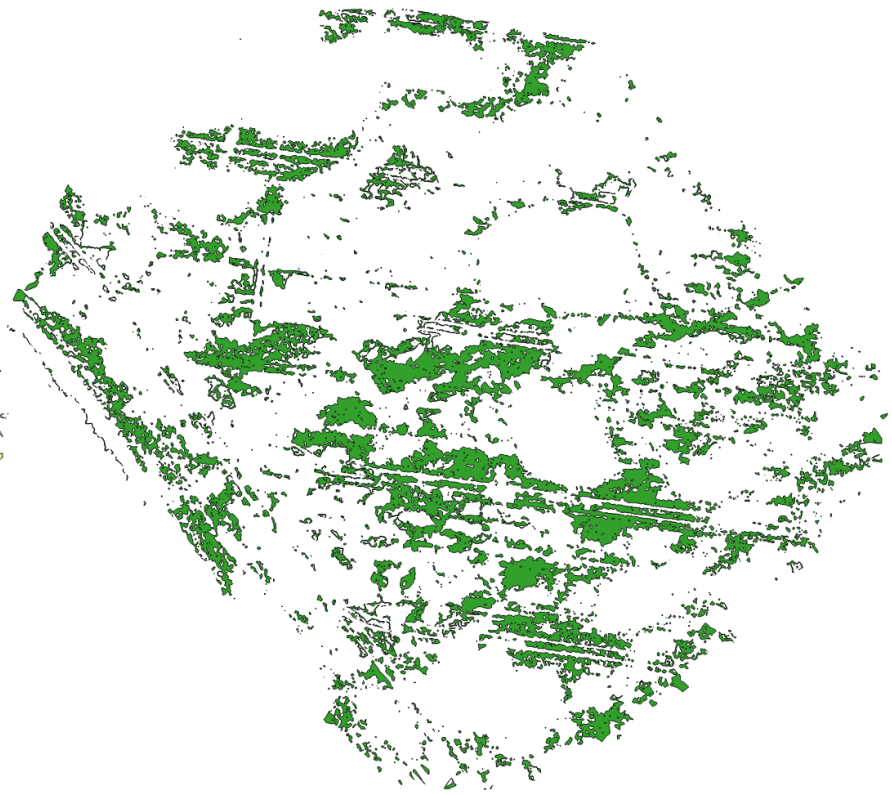
Map of lodging

Lodging: 25-50°
Area: 6442.24 m2



Lodging: 10-25°
Area: 4034.43 m2



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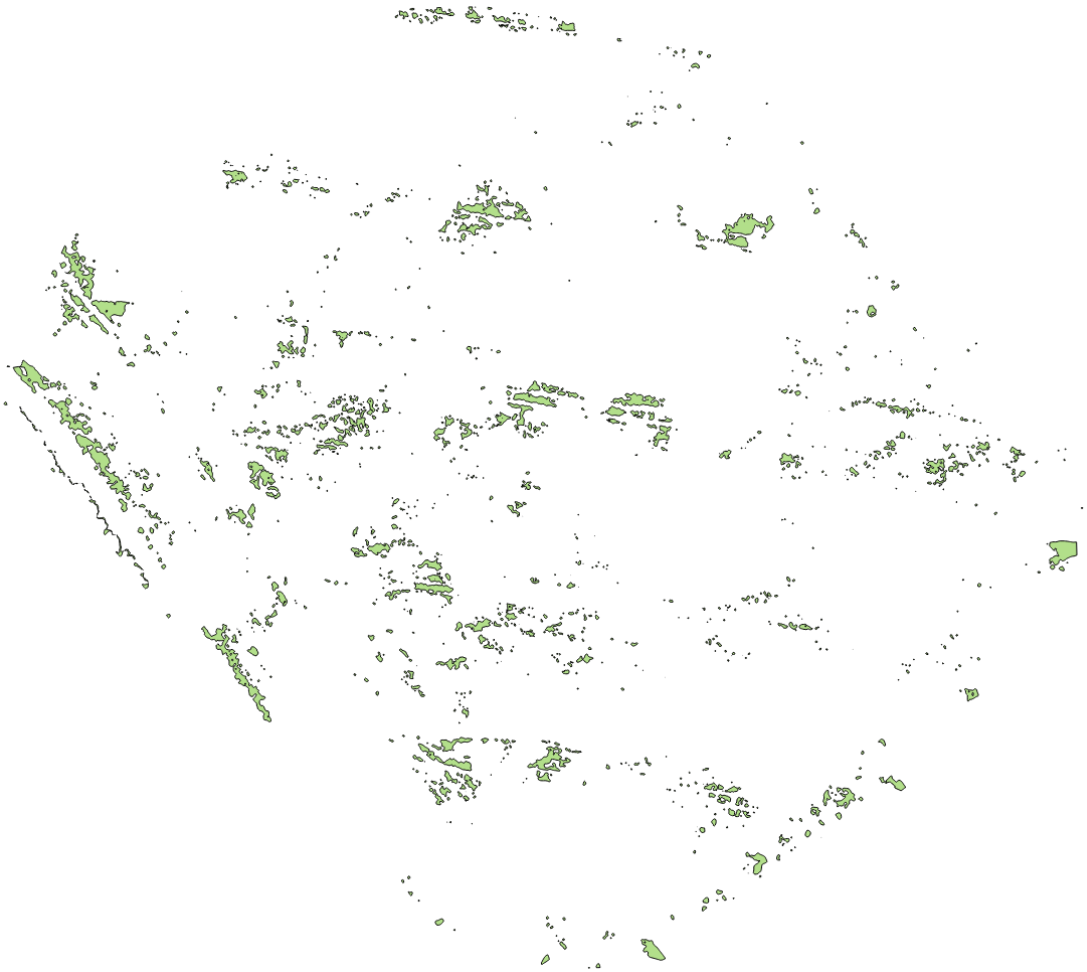
Map of lodging

Lodging: 0-10°
Area: 714.52 m2



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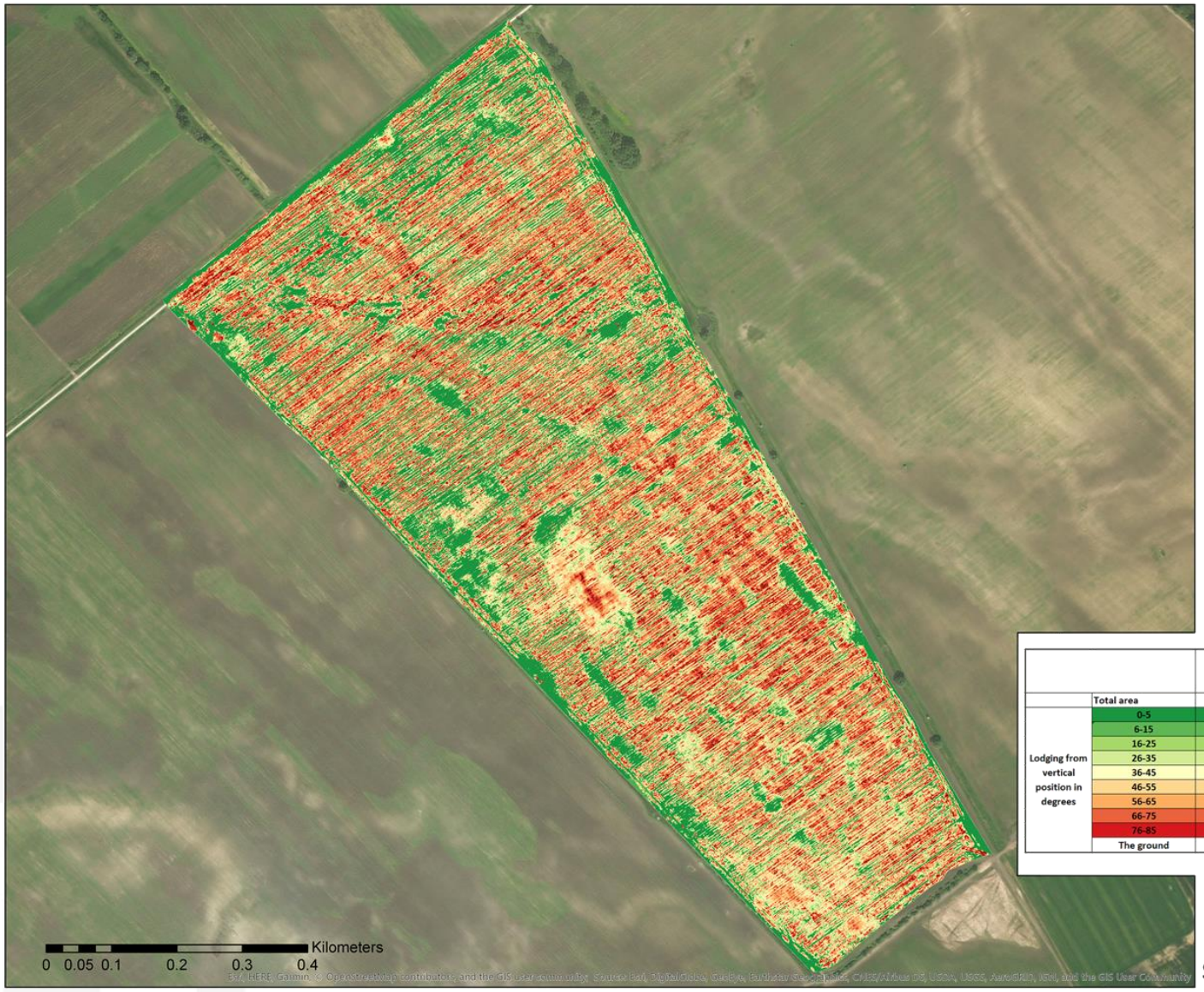
Result of lodging

Field n.2



Total area of the field: 73,12ha

		m2	Percentual representation from total area	Level of lodging
	Total area	731255	100%	
Lodging from vertical position in degrees	0-5	147668.76	20.19%	9
	6-15	5085.33	0.70%	8
	16-25	25317.99	3.46%	7
	26-35	42067.99	5.75%	6
	36-45	60459.48	8.27%	5
	46-55	75014.69	10.26%	4
	56-65	110372.59	15.09%	3
	66-75	123497.57	16.89%	2
	76-85	103175.72	14.11%	1
	The ground	731255	100.00%	/

Scale 1:5500

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Result of lodging

		m2	Percentual representation from total area	Level of lodging
	Total area	731255	100%	
Lodging from vertical position in degrees	0-5	147668.76	20.19%	9
	6-15	5085.33	0.70%	8
	16-25	25317.99	3.46%	7
	26-35	42067.99	5.75%	6
	36-45	60459.48	8.27%	5
	46-55	75014.69	10.26%	4
	56-65	110372.59	15.09%	3
	66-75	123497.57	16.89%	2
	76-85	103175.72	14.11%	1
	The ground	731255	100.00%	/

3.

- World wide analytic tool **AGRO - Inspector**
- Business site: www.agro-inspector.com
- Data analyses

TMG Dronity

Our aplication

AGRO Inspector

Analytical tool for precise agriculture

Download on the App Store

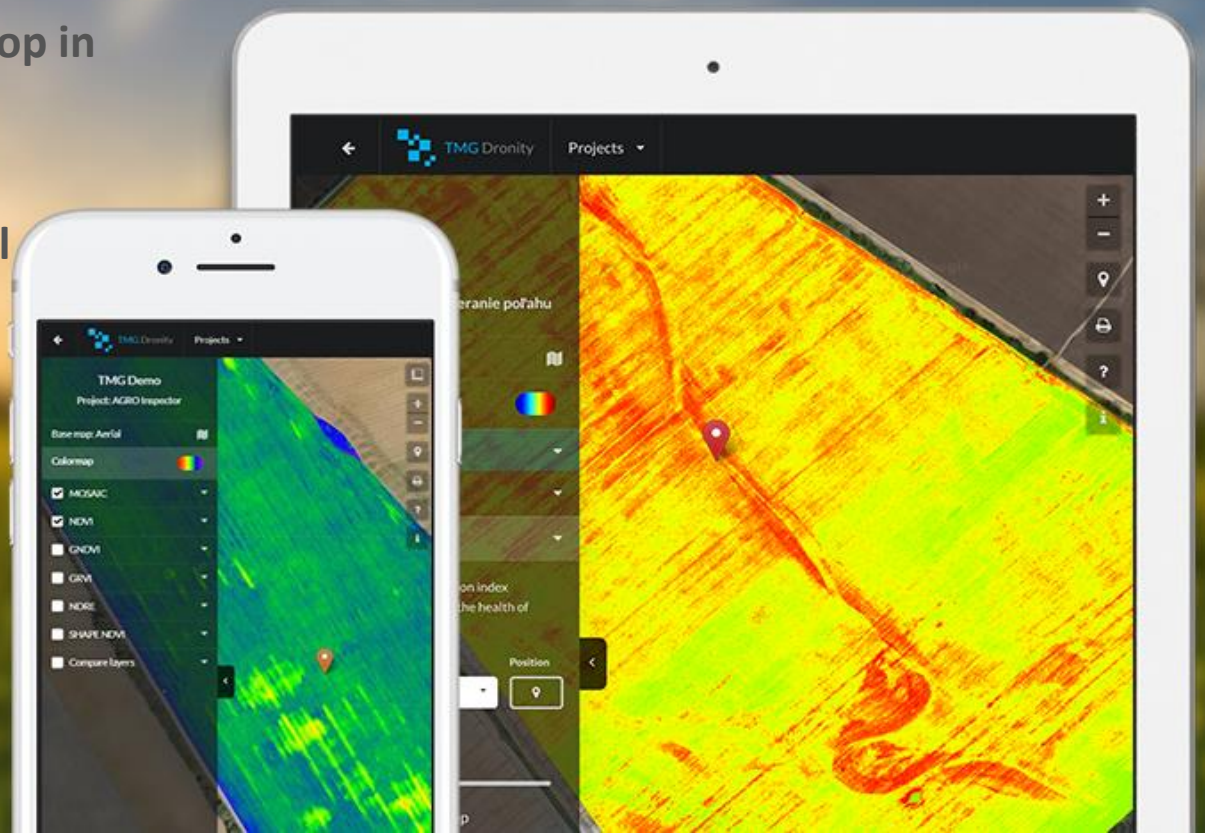
Get it on Google play

Recognize potential damage in crop in advance

- Water stress
- Biomass, nitrogen or chlorophyll content in crops, etc.
- Lodging of plants

MOBILE/DESKTOP APPLICATION

- Easy access to your data
- Fast orientation
- Intuitive control



Our aplication - Business site

www.agro-inspector.com

TMG Dronity

AGRO Inspector - VIDEO

THANK YOU FOR YOUR ATTENTION

DO YOU HAVE ANY QUESTIONS?
WE ANSWER TO YOU LATER...
IF WE WILL KNOW ;)

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