syngenta digital

Cropwise Operations

Unlock the Potential of Your Farm with Digital Agronomy

December 2023

Cropwise Operations

syngenta digital

Syngenta Digital South Africa

www.syngenta.co.za/cropwise-operations

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☎ Pieter Burger | +27 (0) 60 979 8892

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Mobile App for Android

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1

About Cropwise Operations

Cropwise
Operations

About Cropwise Operations

Cropwise Operations is a multi-component digital solution for remote control of agricultural land, which includes real–time monitoring of fields, crop advisory and scheduling, scouting, automated documentation, planning and execution of agricultural operations, compliance management, and comprehensive integration with third–party services and products.

The main goal of Cropwise Operations is to increase the farming efficiency and significantly reduce the cost of ag operations due to early identification of problem areas in fields and rational use of resources.

The company was founded in 2013. It was acquired by Syngenta Group in 2019. Now Cropwise Operations is a leading player in the Eastern Europe digital agriculture market, which is already used by farmers in over 40 millions of hectares.

All-in-One Digital Farming Solution

Modules

Crop Health
Remote monitoring of agricultural land
Cropwise Operations

Agri Operations
Planning and control of agricultural operations
Cropwise Operations

Telematics
Control of your machinery in real time
Cropwise Operations

Mobile Apps

Machinery

CLAAS
Connect Cropwise Operations with data from CLAAS Telematics
CLAAS
Cropwise Operations

CNH
Connect Cropwise Operations with AFS Connect™
CNH INDUSTRIAL
Cropwise Operations

MyJohnDeere
Online platform for management of JohnDeere machinery work
JOHN DEERE
Cropwise Operations

GPS Tracking

Farmer to Farmer

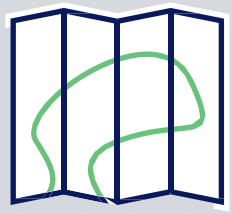
Grain Hub
Benchmark your fields with neighboring fields
Grain Hub
Cropwise Operations

Open Weather
Weather data from neighbors' private weather stations
OPEN WEATHER
Cropwise Operations

Plant Threats
Be notified when threats arise on neighboring fields
PLANT THREATS
Cropwise Operations

Weather Services

42M



Hectares are managed worldwide using the system

5.7M

Agricultural Operations were created by farmers in the system

5K **new Ag Operations every day**

300K+

Scouting Reports made by the users on average each year

95K

Machines are controlled by the users in the system

30K **machines daily**

Season 2023: Updates

- Synthetic NDVI
- Soil Analysis Improvements
- Crops Map for New Countries
- Analysis of Land Resources
- Ag Operations Module Improvements
- VRA Builder Improvements

- Global Catalogs of CP Products
- Warehouse and Stock Management
- **New Automatic Alerts and Alert Notifications on Telegram**
- Telematics Module Improvements
- New Services Integration
- Machinery Data Integration Improvements

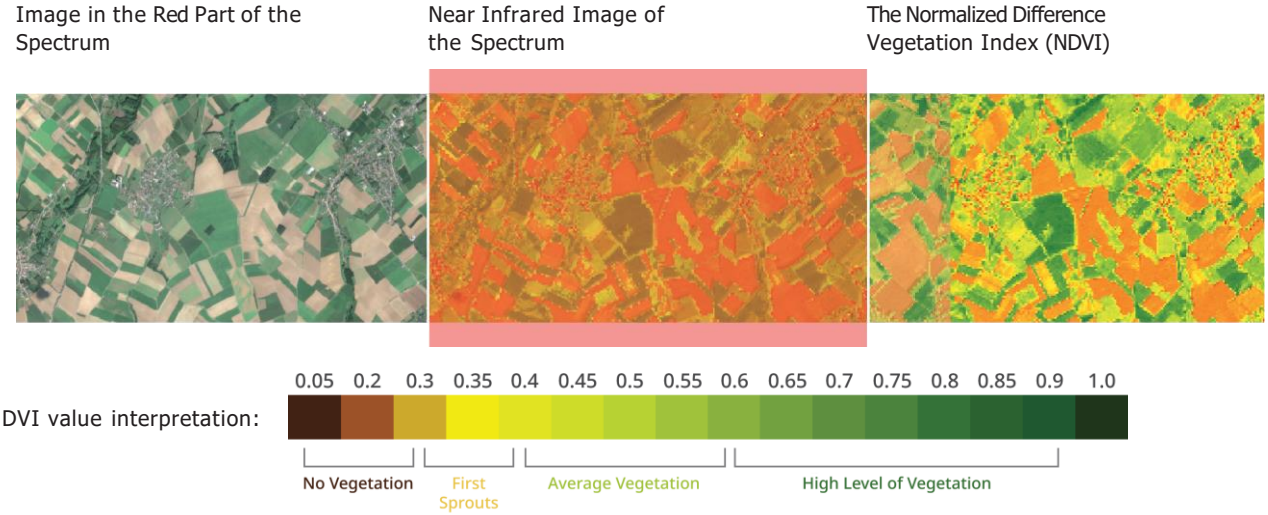
2

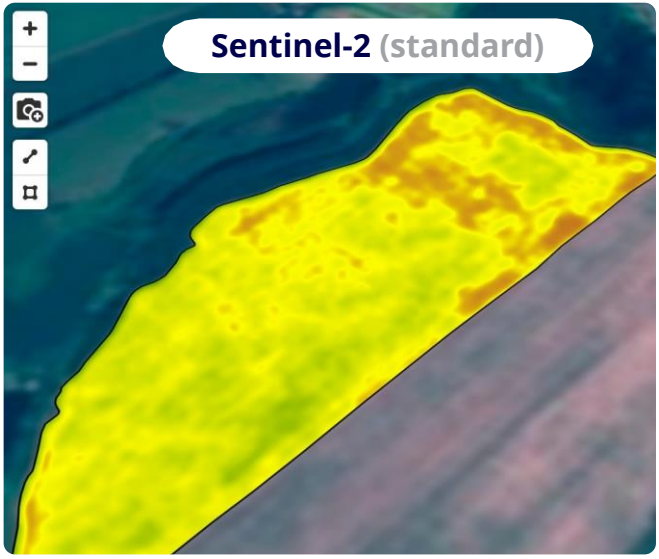
Crop Health. Images

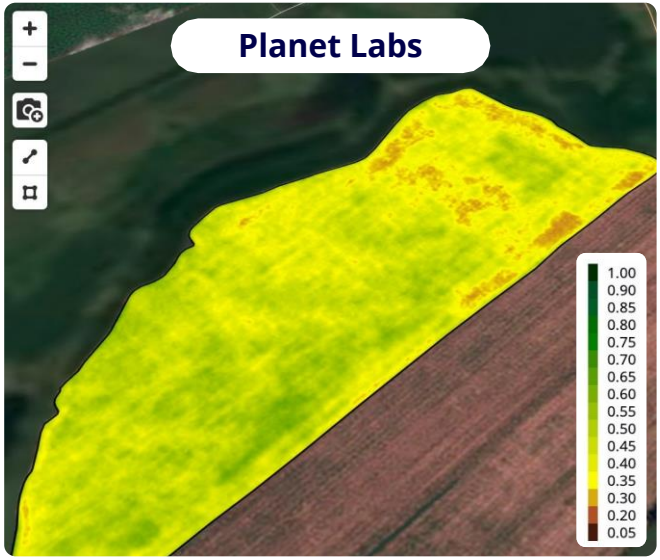
Vegetation Index (NDVI)

NDVI — Normalized Difference Vegetation Index — the indicator used to evaluate and analyze the development of the plant biomass during vegetation. Green leaves of plants absorb waves in the visible red range and reflect waves in the near infrared. The larger the leaf surface of plants is and the more chlorophyll is there in the leaves, the stronger the plants absorb the red light that falls on them (and less reflect it).

The index is calculated as the difference between the reflectance values in the near infrared (NIR) and red (RED) spectral areas, divided by their sum NDVI = (NIR-RED) / (NIR + RED). The system uses a standard Vegetation Scale where the Vegetation Index takes a value from 0 to 1.







Satellite
SENTINEL–2

Satellite
PLANET LABS

Resolution
10 m per 1 pixel

Resolution
3 m per 1 pixel

Frequency
3 - 5 days
(since 2016) *

Frequency
Daily
(since 2020)

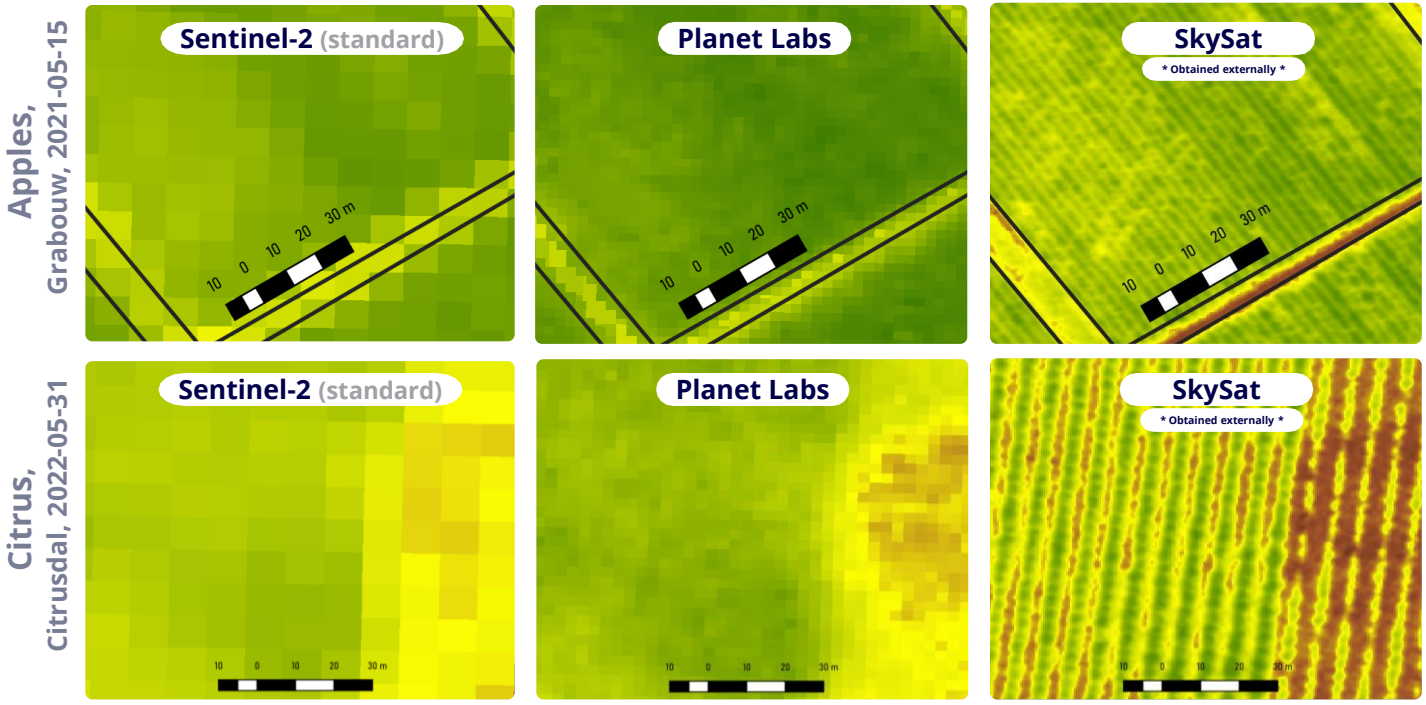
* LANDSAT-8 since 2013

Daily imagery ensures you have access to timely, cloudless images

With **10x higher resolution** you can identify issues earlier and easier

Precision VRA maps are more accurate and promotes target-specific applications

Comparison of satellite imagery currently available

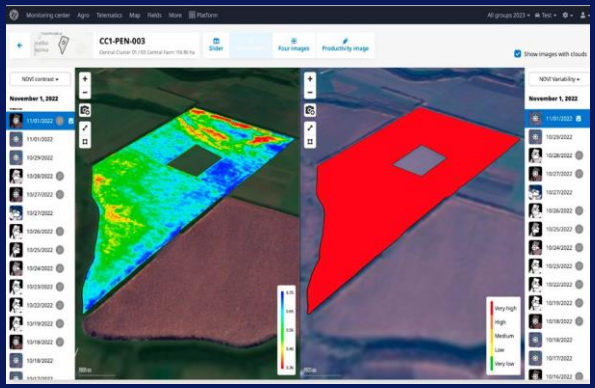


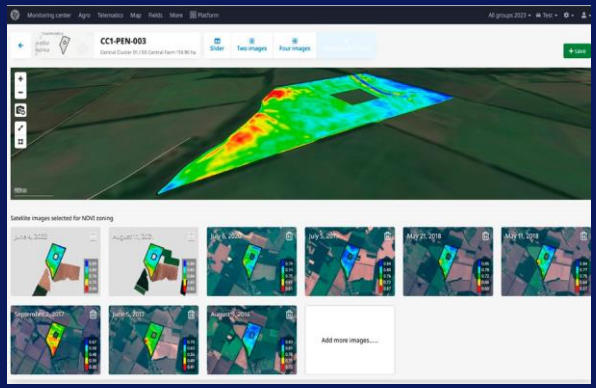
	SENTINEL–2	PLANET LABS	SKYSAT
Satellite:			
Resolution:	**10 m** per 1 pixel	**3 m** per 1 pixel	**50 cm** per 1 pixel [tree-level]
Frequency:	**Every 5 days (since 2016)**	**Daily (since 2020)**	**On request ('tasking') and limited historic images ('archive')**
	* Available for free on the standard Cropwise Operations subscription	* Integrates with Cropwise Operations via an additional subscription	* Available externally from Cropwise Operations, but we are able to obtain and upload it

Image Lab

The tool helps to compare different types of images (Visible, NDVI, NDVI contrast, and NDVI Variability) to consider all the factors that affect crop yields. The Image Lab tab is located on a field page and offers the user several solutions for a comprehensive analysis of the field condition and crops development.

The tool makes it possible to overlap different types of images to understand better, for example, how the terrain features affect crop vegetation. Based on the Productivity Images the user can create VRA tasks, manage problematic and productive areas of the field, control technological operations' risks.

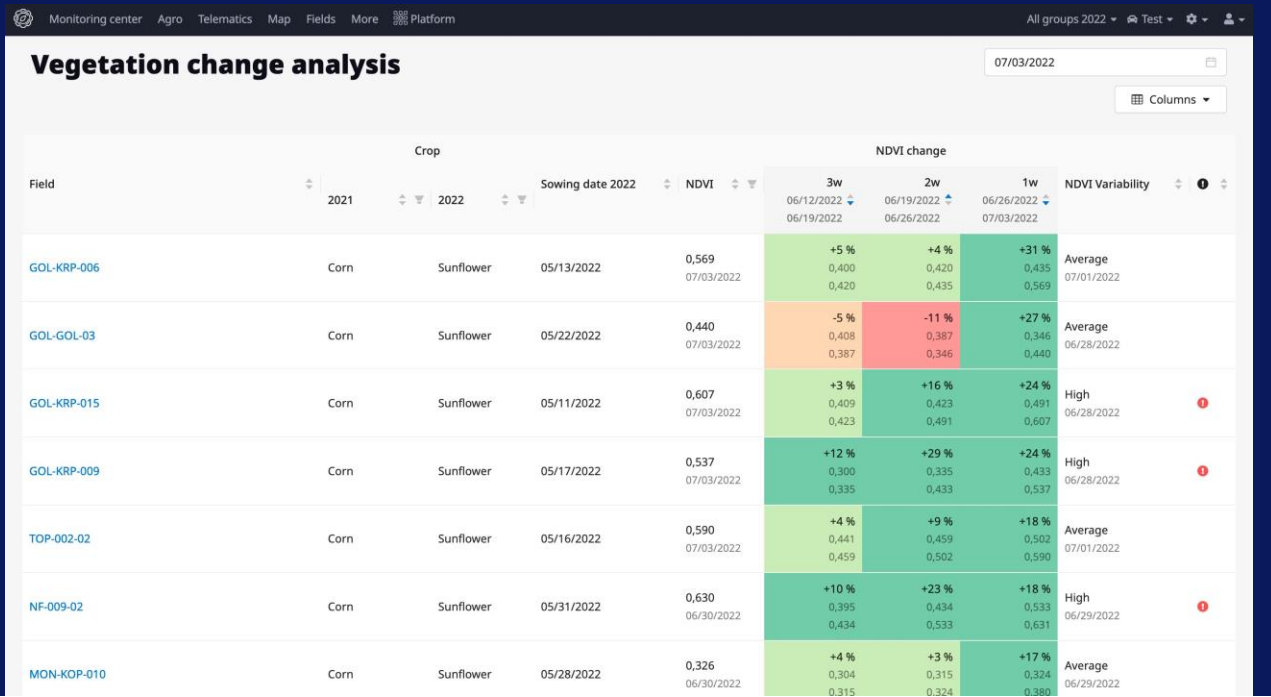




Vegetation Change Analysis

Cropwise Operations enables its users to track the Vegetation Index (NDVI) changes within three weeks from a selected day in all fields of a required field group.

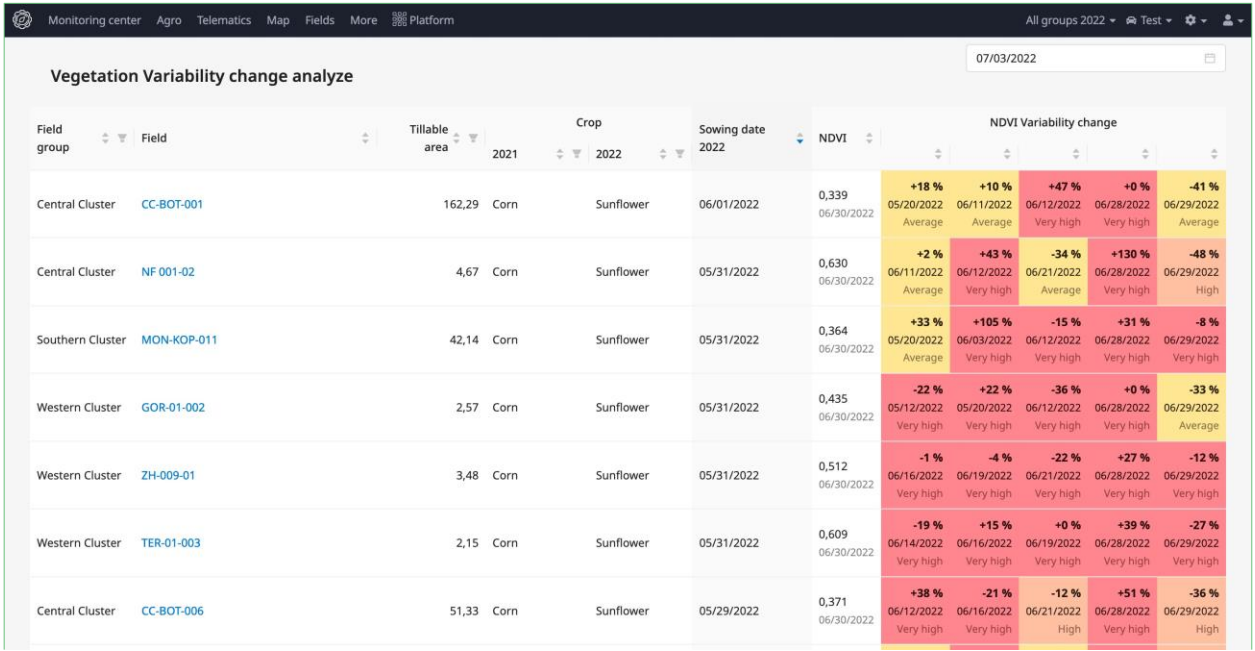
Percentage changes are calculated based on the analysis of Sentinel-2 and Landsat 8 satellite images.



Vegetation Variability Change Analysis

NDVI Variability images help to notice deviations in plant development in time. The highest value (or red color) of the variability means significant Vegetation Index difference within the boundaries of one field, i.e. 0.08 and more. Cropwise Operations recommends paying closer attention to such fields.

The report shows changes in field development over several months, which helps the user to determine the real causes of problems in the field.

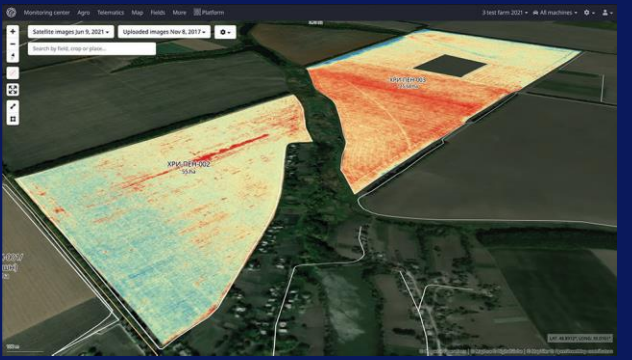


Field group	Field	Tillable area	Crop 2021	Crop 2022	Sowing date 2022	NDVI	NDVI Variability change				
Central Cluster	CC-BOT-001	162,29	Corn	Sunflower	06/01/2022	0,339 06/30/2022	+18 % 05/20/2022 Average	+10 % 06/11/2022 Average	+47 % 06/12/2022 Very high	+0 % 06/28/2022 Very high	-41 % 06/29/2022 Average
Central Cluster	NF 001-02	4,67	Corn	Sunflower	05/31/2022	0,630 06/30/2022	+2 % 06/11/2022 Average	+43 % 06/12/2022 Very high	-34 % 06/21/2022 Average	+130 % 06/28/2022 Very high	-48 % 06/29/2022 High
Southern Cluster	MON-KOP-011	42,14	Corn	Sunflower	05/31/2022	0,364 06/30/2022	+33 % 05/20/2022 Average	+105 % 06/03/2022 Very high	-15 % 06/12/2022 Very high	+31 % 06/28/2022 Very high	-8 % 06/29/2022 Very high
Western Cluster	GOR-01-002	2,57	Corn	Sunflower	05/31/2022	0,435 06/30/2022	-22 % 05/12/2022 Very high	+22 % 05/20/2022 Very high	-36 % 06/12/2022 Very high	+0 % 06/28/2022 Very high	-33 % 06/29/2022 Average
Western Cluster	ZH-009-01	3,48	Corn	Sunflower	05/31/2022	0,512 06/30/2022	-1 % 06/16/2022 Very high	-4 % 06/19/2022 Very high	-22 % 06/21/2022 Very high	+27 % 06/28/2022 Very high	-12 % 06/29/2022 Very high
Western Cluster	TER-01-003	2,15	Corn	Sunflower	05/31/2022	0,609 06/30/2022	-19 % 06/14/2022 Very high	+15 % 06/16/2022 Very high	+0 % 06/19/2022 Very high	+39 % 06/28/2022 Very high	-27 % 06/29/2022 Very high
Central Cluster	CC-BOT-006	51,33	Corn	Sunflower	05/29/2022	0,371 06/30/2022	+38 % 06/12/2022 Very high	-21 % 06/16/2022 Very high	-12 % 06/21/2022 High	+51 % 06/28/2022 Very high	-36 % 06/29/2022 High

UAV Images

Users can upload field shots made by unmanned aerial vehicles (UAVs) — drones, copters, etc. into Cropwise Operations.

This tool helps to obtain accurate information about the crop condition in all field areas due to images with very high resolution (up to several centimeters per pixel). The tool can be used to analyze the crop condition, when the weather does not allow the satellite to take a high-quality image.



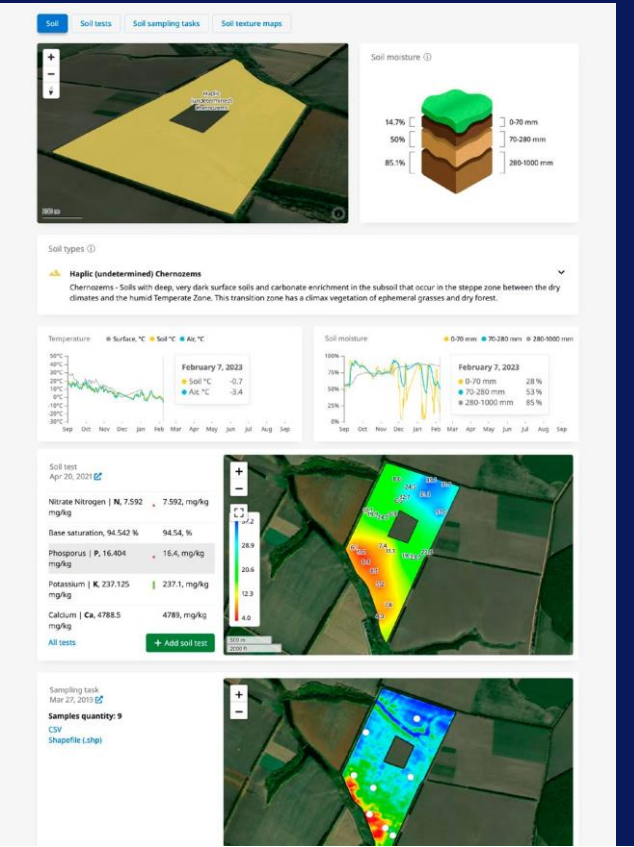
3

Crop Health. Soil and Weather

The Soil Tab

Analyze the dynamics of key indicators of soil quality, compare them and assess the effect of soil condition on crop yields in the Soil Tab on the field page.

The most recent data on soil surface temperature, soil moisture on three different depths and charts for changes in these indicators within a year are available on one page. The field soil types are automatically determined according to the FAO global classification and their detailed description is provided. On this page the user can also find the latest Soil Tests, Sampling Tasks and Soil Texture Map.



In the Soil Tab, determine points for soil sampling, upload soil test results and generate analysis maps based on them. Create soil texture maps using electrical conductivity tests and soil brightness images.

Soil Temperature

Soil Moisture

Soil Types

Soil Conductivity

Soil Sampling Tasks

Soil Tests

Micro- and Macronutrients Content Maps

Soil Texture Maps

Soil Analysis

One can add Soil Tests to Cropwise Operations both manually, and upload from a file. Soil Analysis Maps are generated based on the Soil Test results. Soil Tests can be used as the data source for Variable Rate Application (VRA) tasks. One can also compare Soil Analysis Maps and Vegetation Maps for current and previous seasons to see how structure and type of the soils affect the yields.

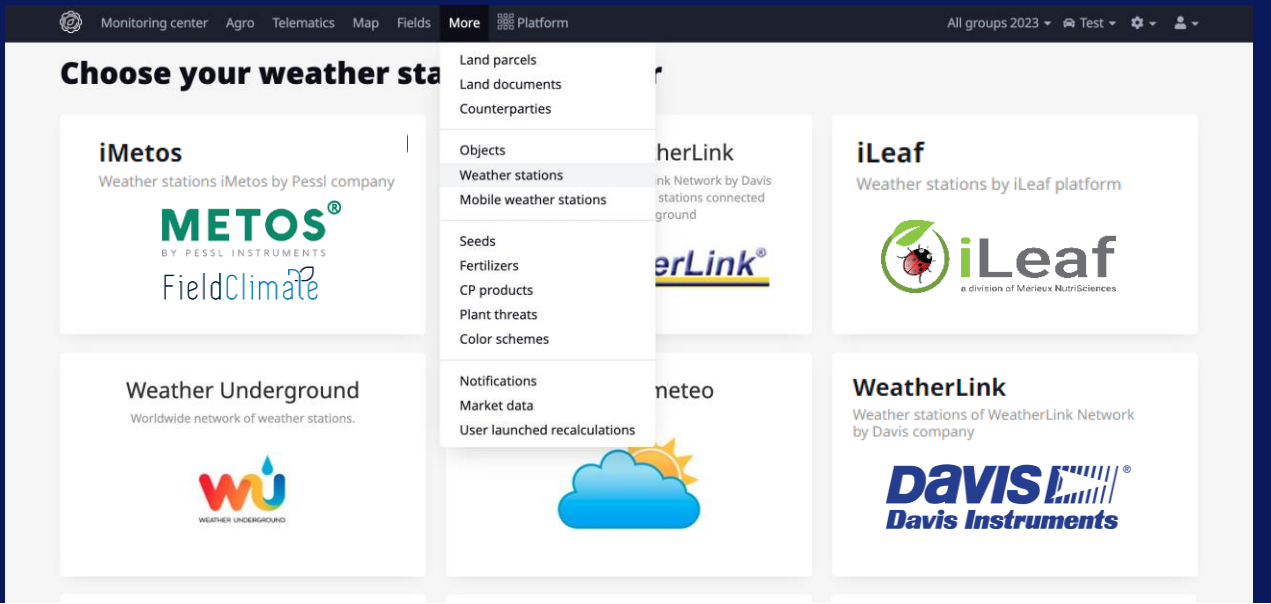
- **Import of Soil Test results from a spreadsheet in the following formats: .csv, .ods, .xls, .xlsx, .dbf**
- **The Analysis Method is a new required indication for potential third–party services integration and crop nutrition recommendations.**
- **The ability to specify nutrients content level in soil.**
- **The Soil Analysis Maps for field groups and the option to download them as PDF files.**
- **Soil Test results downloading in Excel file.**

Monitoring center
Agro
Telematics
Map
Fields
More
Platform
All groups 2023
Test
Soil
Soil tests
Soil sampling tasks
Soil texture maps
CC-PEN-005
Central Cluster / 003
Central Farm
Sunflower, 118.06 ha.
Dashboard
Soil
Agrooperations status
Agro operations
Nutrition plan
Scouting tasks
Scout reports
Notes
Alerts
Field history
Crop rotation
Area & shapes
Uploaded images
Analytics
Timeline
Image lab
Yield estimation
Download
Made at: April 18, 2022
Edit
Excel
Delete
435
363
292
220
148
300 m
1000 ft
Element
Calcium | Ca, 3908.17 mg/kg
Magnesium | Mg, 246.74 mg/kg
Manganese | Mn, 90.43 mg/kg
Boron | B, 1.72 mg/kg
Copper | Cu, 4.08 mg/kg
Molybdenum | Mo, 0.43 mg/kg
Iron | Fe, 172.52 mg/kg
Zinc | Zn, 1.41 mg/kg
Sulfur | S, 1.35 mg/kg
Phosporus | P, 21.87 mg/kg
Potassium | K, 266.96 mg/kg
Sodium | Na, 21.57 mg/kg
Soil acidity, 6.67 pH

Weather Data

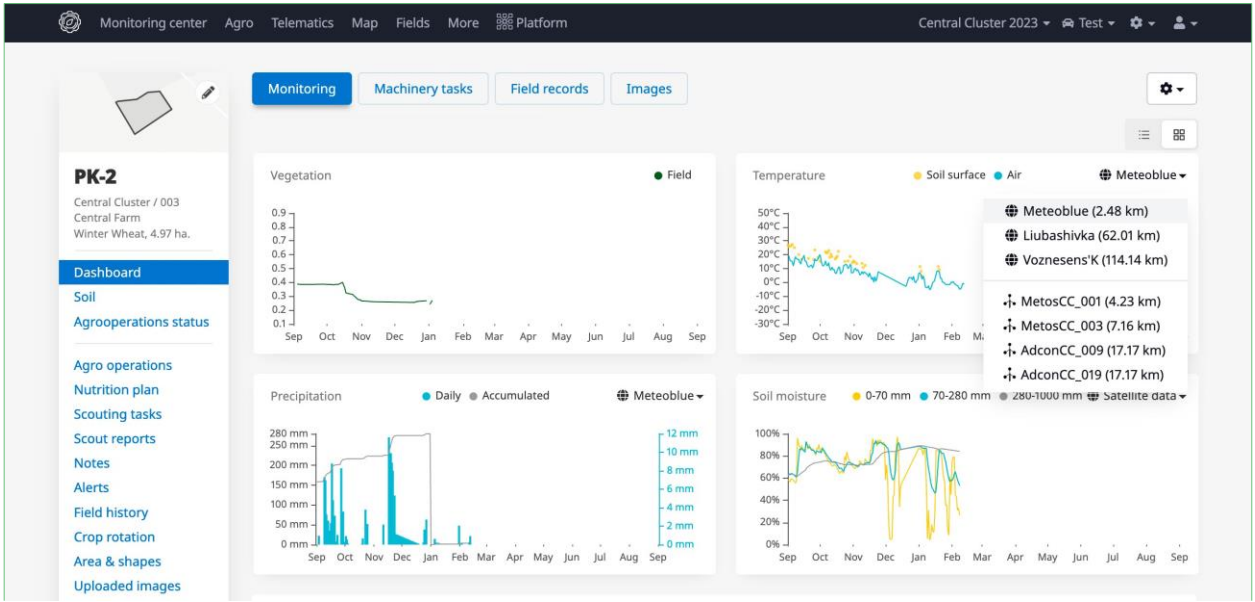
Cropwise Operations receives weather data from global public weather stations of the World Meteorological Organization system, global private weather services (Dark Sky, Meteoblue), satellite systems, and private weather stations if any.

Weather data is calculated individually for each field. The system automatically identifies the most reliable data source for each field depending on its location. Air temperature and precipitation data is updated daily. Besides, historical information about weather conditions is available.



Add your private weather stations to the system. Cropwise Operations integrates data from Adcon, Arable, Davis, iMetos, Weather Underground and other services. The system will automatically determine two global and four private stations closest to each field. You are free to choose from which to display weather data for your field.

The system also generates an individual weather forecast for every field that allows farmers to plan field works more efficiently. One can also receive weather forecast from private stations if they have software with such functionality. All users can receive an extended daily weather report in emails.



Soil moisture

The dynamics of Soil Moisture change determines its water regime and has a strong influence both on the course of biological processes in the soil, and on providing plants with water, and consequently — on the quality of the yield.

The system displays Soil Moisture in percentage of total water holding capacity. Total moisture capacity characterizes the ability of the soil to retain moisture, in case all the pores are completely filled with water. The indicator helps to track the tendency to increase or decrease the amount of moisture in the soil.

Cropwise Operations uses data combinations obtained from four satellites — synthetic-aperture radar and weather satellites to calculate Soil Moisture at three depths:

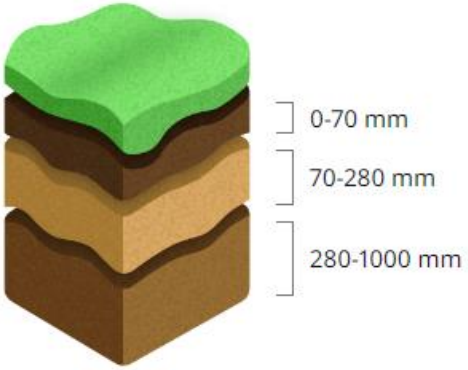
- from 0 to 7 cm (0 to 70 mm)
- from 7 to 28 cm (70-280 mm)
- from 28 to 100 cm (280-1000 mm)

Satellites are using soil microwave scanning technology on a daily basis. The initial resolution is 10x10 km per pixel with a possible increase (based on the weather data analysis) up to 1x1 km per pixel. Microwave scanning is performed with the same accuracy for all depths.

Today this model is considered to be the most reliable in the world.

Soil moisture level at three depths

Soil moisture is indicated in 1 m³ per 1 m³ of soil at different depths. The **top 0-7cm** is the most critical as this is where seeds germinate and most of the roots are located. The **sub 7-28cm** is important for nutrients and reservoir for soil moisture.

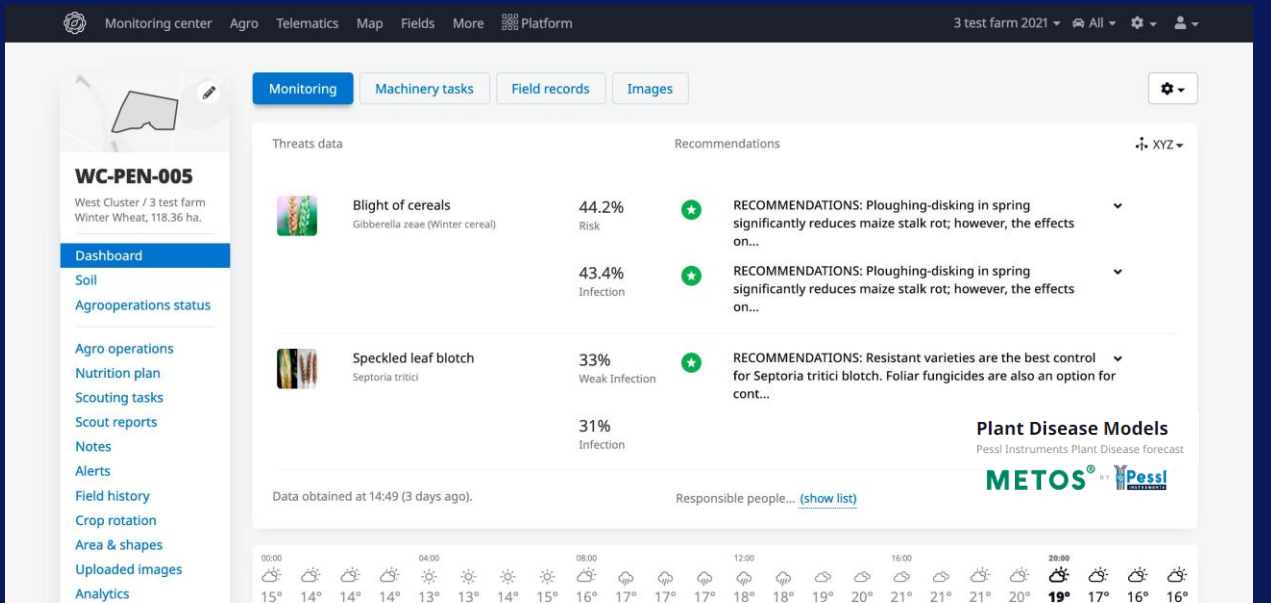


Moisture	Description	Crop and vehicle traffic
90 % +	Flooded / Excessive	Crops will wilt from excess moisture.
80 – 90 %	Oversaturated / waterlogged	Crops will struggle to grow.
70 – 80 %	Saturated / Abundant	Crops will grow well.
60 – 70 %	Very wet	Crops will grow very well.
50 – 60 %	Wet / Adequate	Crops will grow optimally.
40 – 50 %	Slightly wet / Good	Crops will grow very well.
30 – 40 %	Somewhat dry / Limited	Crops will grow, but not well.
20 – 30 %	Dry	Crops will struggle to grow.
10 – 20 %	Very dry / Insufficient	Crops will start to wilt.
< 10 %	Critically dry	Crops will wilt.

Plant Disease Control

Cropwise Operations integrates all modifications of iMetos weather stations by Pessl Instruments and supports company's Plant Disease Models tool. The service requires the availability of your own iMetos weather station added to the Cropwise Operations account and a license to use the tool.

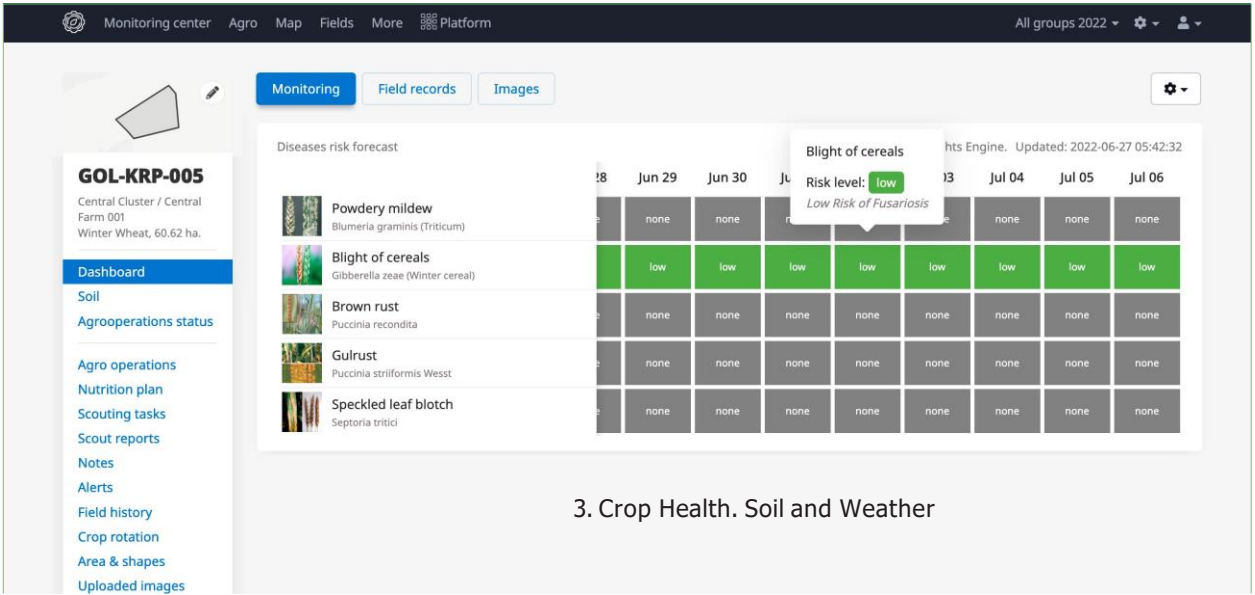
In a real–time mode one can get the forecast for over 85 disease models for 40 crops. The working range is up to 50 km from a weather station for all fields with a specific crop. It is also possible to set specific criteria — a disease, probability percentage of the disease — to receive automatic notifications as soon as the forecast meets certain conditions.



Cereal Disease Risk Forecast

The Cereal Diseases Risk Forecast service based on the Avizio model works for fields with spring and winter wheat and barley. The system warns about the risks of Brown Rust, Powdery Mildew, Septoria, Fusarium, and more. The first forecasts are formed starting approximately from stage 30 (beginning of Stem Elongation) of the BBCH scale for cereal crops. The forecast is created for ten days. Data is updated on average every 24–30 hours.

We are busy evaluating the cereal disease risk models for South Africa.



3. Crop Health. Soil and Weather

Cereal disease risk models being evaluated for South Africa:

Wheat
Powdery mildew
Speckled leaf blotch
Brown rust
Eye spot
Yellow / Stripe rust

Barley
Leaf scald
Net blotch
Powdery mildew
Ramularia leaf spot
Brown rust

Canola
Sclerotinia stem rot

4

Crop Health.
Yield Estimate

Crop Yield Estimate

The Yield Estimate is an expected/predicted crop yield calculated by the system automatically. All estimates are generated for an individual field by comparing with fields from the target group and based on the following data:

Crop
The system selects fields with the target crop type.

Location
By default, the fields are selected in the radius of 200–500 km.

Vegetation
The system selects the fields with similar Vegetation Indices.

Variety
The system selects the fields with the same crop varieties, if any.

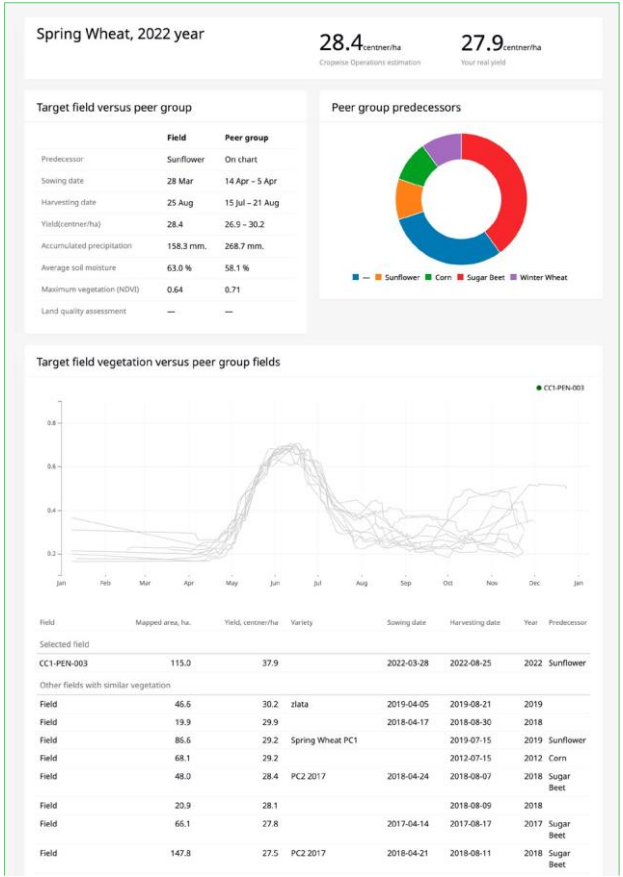
Sowing Dates
The fields with the most similar seeding dates are selected.

Precipitation
The fields with the most similar precipitation data are selected.

The Yield Estimate feature is available for more than 15 crops. If images are available, the first forecast for winter crops can be generated on week 5–6 after snow melts, for spring crops — on the fourth week after emergence.

The system updates the estimate every time it gets a quality daily image and adjusts it when gets a high–resolution image. Cropwise Opertations provides consolidated data on the Yield Estimate for each crop for field group, company, and individual estimate for each field.

The main contributing factor for the Yield Estimate accuracy is the quality and volume of the data entered by the users for analysis. In general, the more data (historical information) we have and the more detailed it is — the more accurate analysis we get from the system.

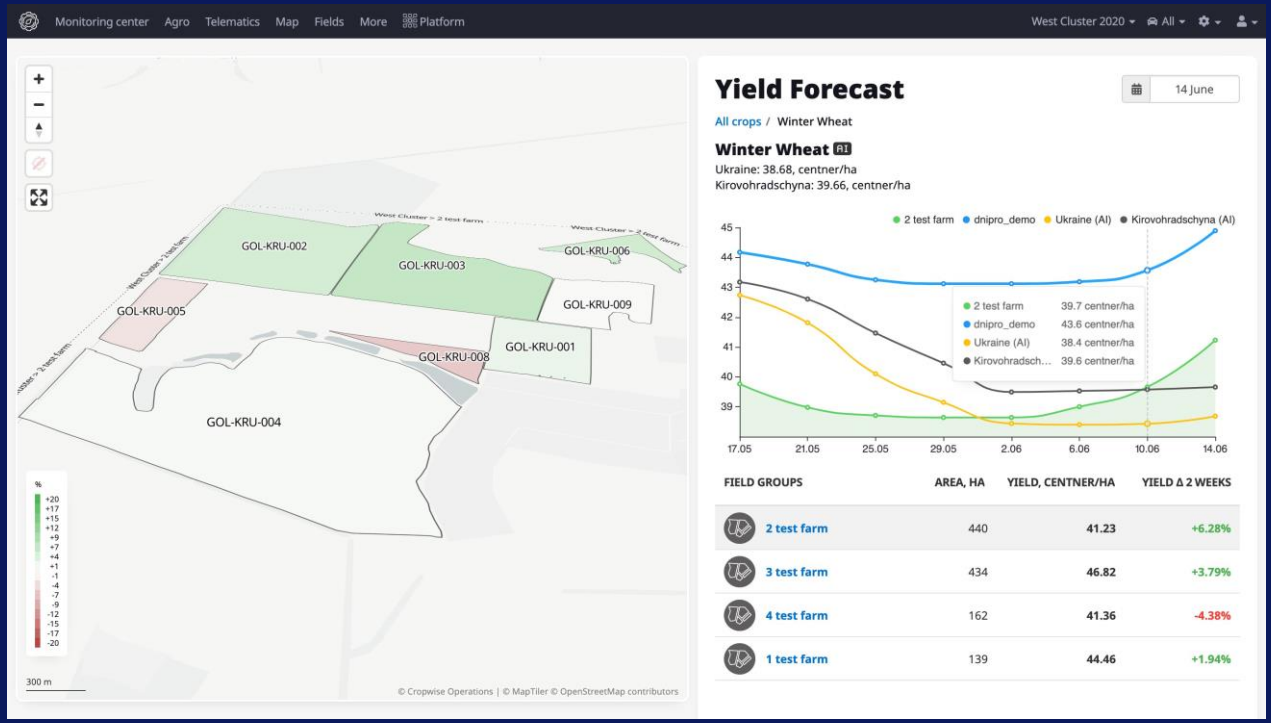


Crop Yield Forecast. Tracking of Changes

The Yield Forecast tool allows the users to benchmark dynamics of the Yield Estimates for a field, field group, company, region, and country by crops in the web–based version of Cropwise Operations.

The tool shows the current Yield Forecast and the dynamics of its changes for two weeks. The forecast is available separately for crops, field groups and individual fields. The system compares crop yield forecast for the field group (the field) with the average indicator for the company, region, country.

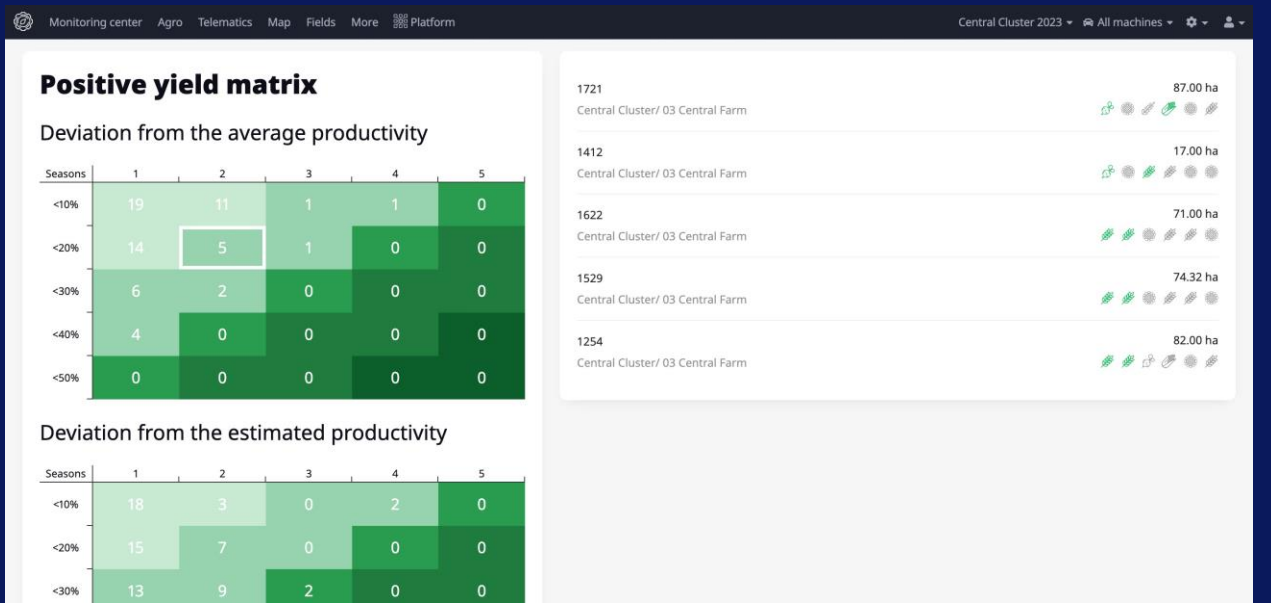
In the Yield Forecast tab in the Agri section, a complete history of Yield Forecast changes is available both for a particular field group and an individual field. The user can easily track the indicators' history and see, for example, at what point the forecast began to decline, and identify the reasons for negative dynamics: weather conditions, technological errors, etc.


Monitoring center
Agro
Telematics
Map
Fields
More
Platform
West Cluster 2020
All
GOL-KRU-002
GOL-KRU-003
GOL-KRU-006
GOL-KRU-005
GOL-KRU-009
GOL-KRU-001
GOL-KRU-008
GOL-KRU-004
300 m
© Cropwise Operations | © MapTiler © OpenStreetMap contributors
Yield Forecast
14 June
All crops / Winter Wheat
Winter Wheat A1
Ukraine: 38.68, centner/ha
Kirovohradschyna: 39.66, centner/ha
2 test farm
dnipro_demo
Ukraine (AI)
Kirovohradschyna (AI)
2 test farm 39.7 centner/ha
dnipro_demo 43.6 centner/ha
Ukraine (AI) 38.4 centner/ha
Kirovohradsch... 39.6 centner/ha
17.05
21.05
25.05
29.05
2.06
6.06
10.06
14.06
FIELD GROUPS
AREA, HA
YIELD, CENTNER/HA
YIELD Δ 2 WEEKS
2 test farm 440 41.23 +6.28%
3 test farm 434 46.82 +3.79%
4 test farm 162 41.36 -4.38%
1 test farm 139 44.46 +1.94%

Yield Matrix

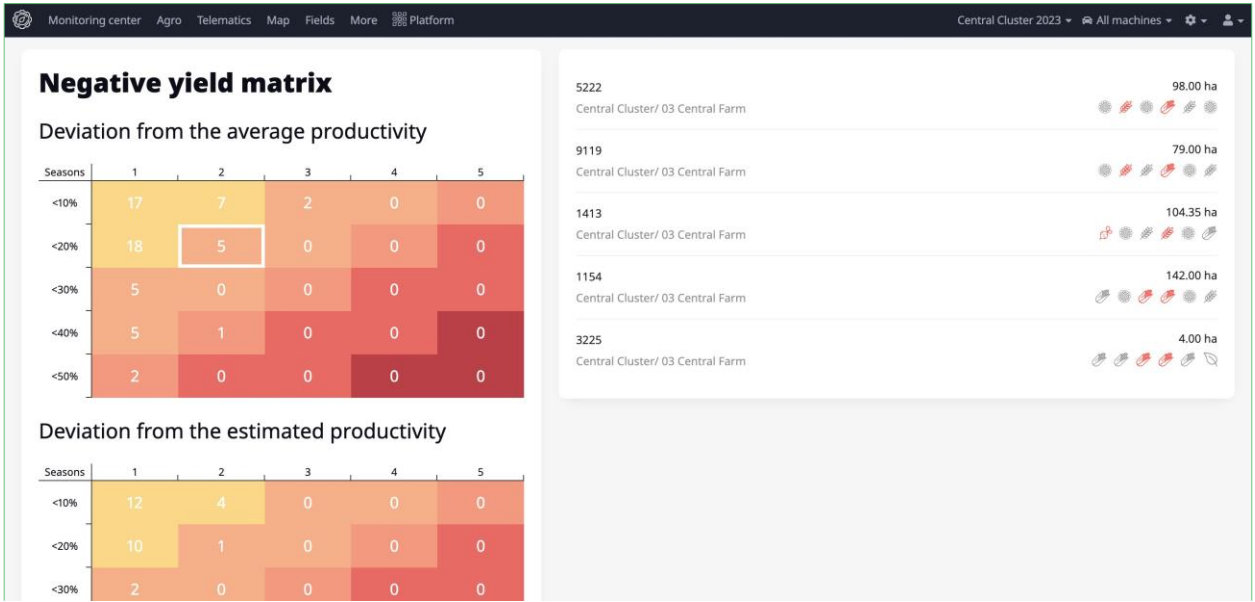
The tool helps to identify productive and unproductive fields i.e., where yields are significantly higher or lower from season to season, as compared to the average factual and estimated yield of the field group.

The system analyses actual and estimated productivity of the fields over five seasons and determines a deviation as a percentage of the group average. A field gets into the list of productive/unproductive fields when it demonstrates consistently high or low yields during several seasons in the row.



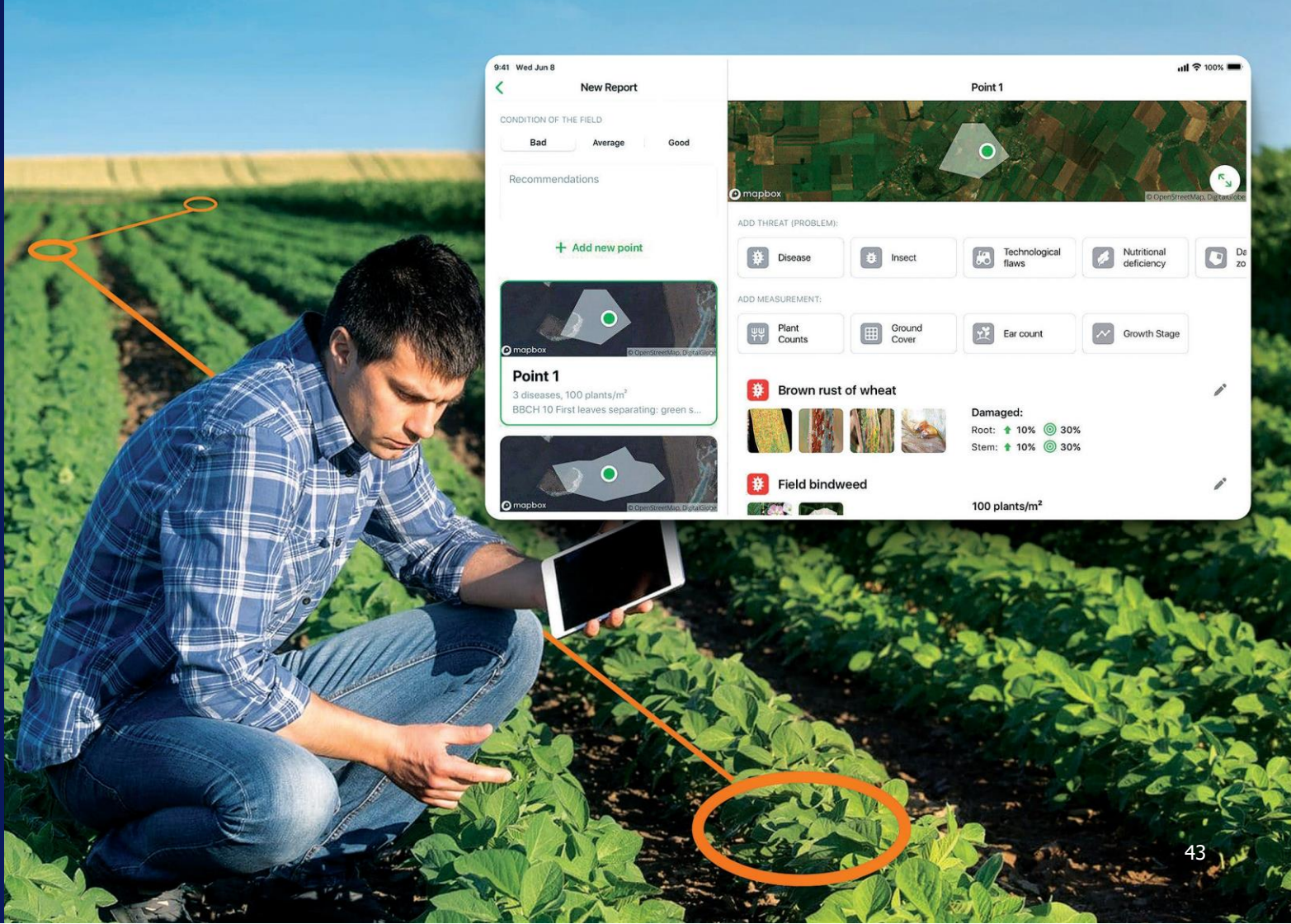
As a result, the user can immediately see the fields giving yields of 20% higher or lower in two out of five seasons as compared to the fields with the same crop in the same field group. Users are advised to pay attention to these fields.

For example, focus on the assets that bring significant risk and decide on future actions: work to eliminate risk factors, use such fields for more stable crops, get rid of the unproductive lands, or undertake more sustainable practices. The most productive fields can be used to grow high-profitable crops.



5

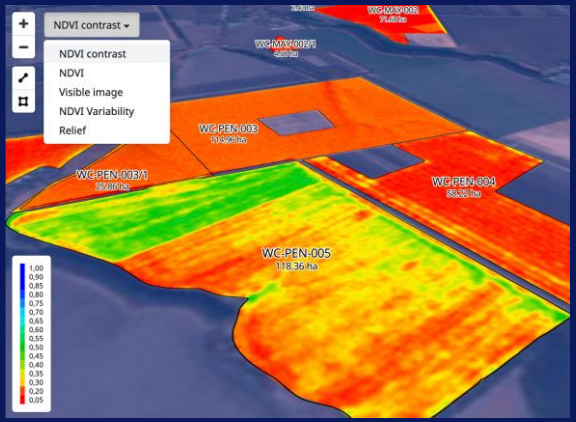
Scouting

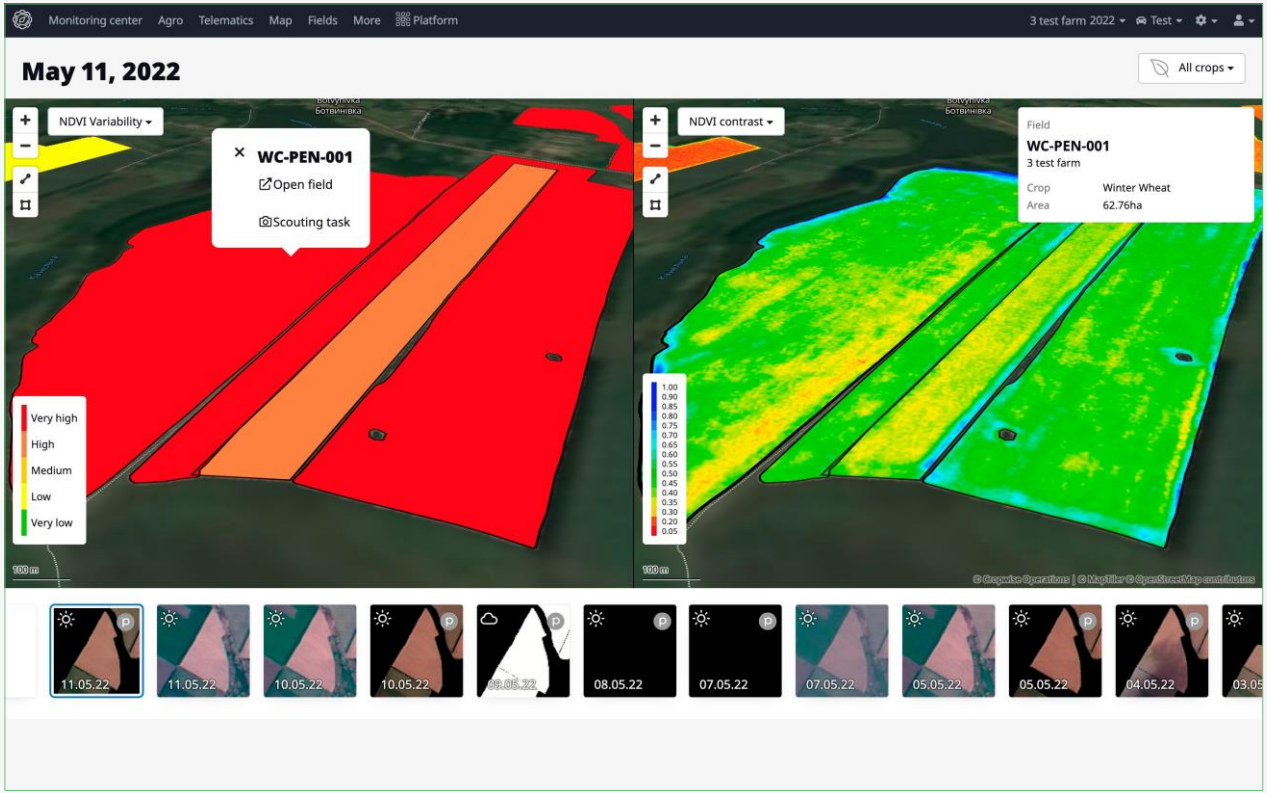

9:41 Wed Jun 8
New Report
CONDITION OF THE FIELD
Bad
Average
Good
Recommendations
+ Add new point
mapbox
Point 1
3 diseases, 100 plants/m²
BBCH 10 First leaves separating: green s...
Point 1
ADD THREAT (PROBLEM):
Disease
Insect
Technological flaws
Nutritional deficiency
ADD MEASUREMENT:
Plant Counts
Ground Cover
Ear count
Growth Stage
Brown rust of wheat
Damaged:
Root: 10% 30%
Stem: 10% 30%
Field bindweed
100 plants/m²

Scouting Map

The tool helps to identify problematic areas in the fields more accurately, especially with Planet Labs' images available. With Scouting Map you can plan field inspections more efficiently and save up to $0.5 per year per hectare on field trips by replacing random field inspections with targeted scouting of problematic areas.

Choose a field group and crop on the Scouting Map. Remotely analyze your crop's condition using Planet Labs' images and identify areas to check. To spot abnormalities in plant development in time, the system recommends comparing the NDVI Variability and NDVI Contrast images.




Monitoring center
Agro
Telematics
Map
Fields
More
Platform
3 test farm 2022
Test
May 11, 2022
All crops
NDVI Variability
WC-PEN-001
Open field
Scouting task
Very high
High
Medium
Low
Very low
NDVI contrast
Field
WC-PEN-001
3 test farm
Crop
Winter Wheat
Area
62.76ha
11.05.22
11.05.22
10.05.22
10.05.22
08.05.22
07.05.22
07.05.22
05.05.22
05.05.22
04.05.22

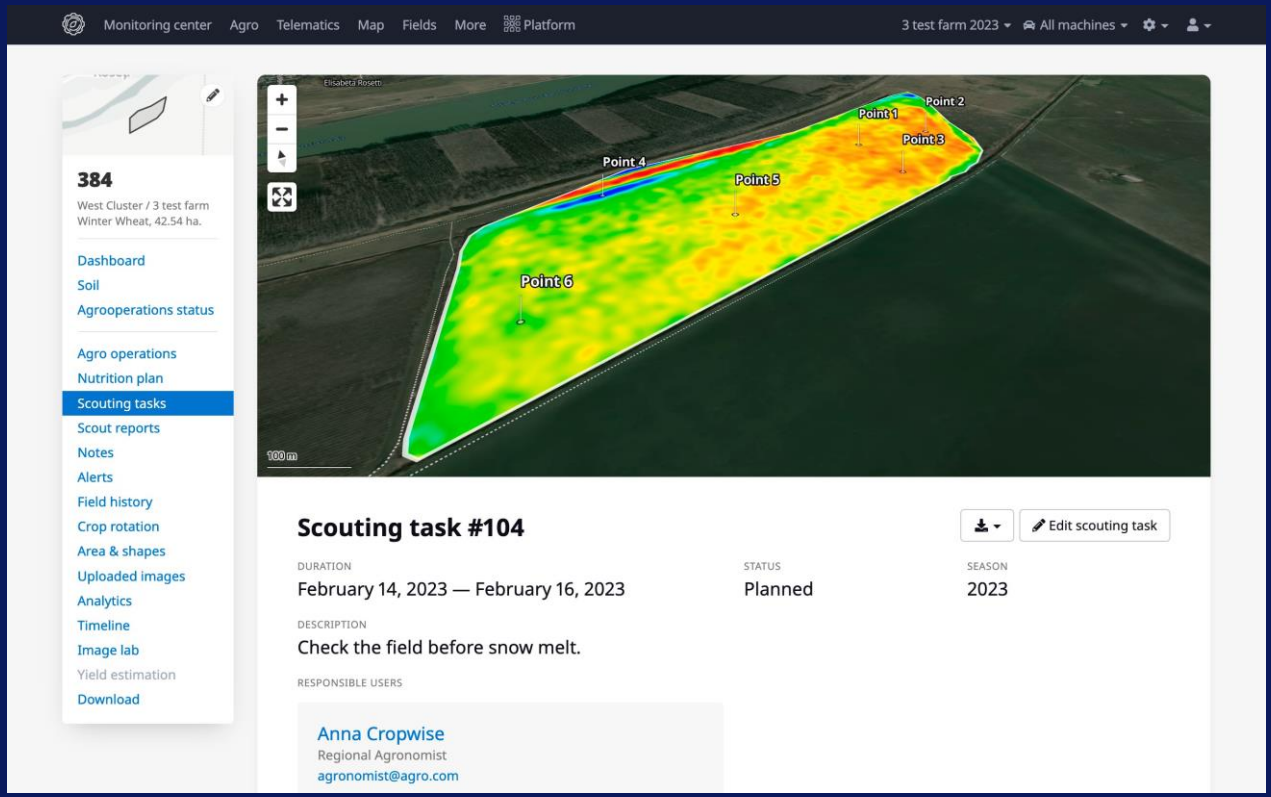
Scouting Tasks

Cropwise Operations enables creating Scouting Tasks in manual and automatic modes. The tool allows to plan field inspections remotely and distribute scouting zones among agronomists.

Manual Tasks require actions from a responsible person. Based on the analysis of the satellite images, identify fields that require attention and select the user who will be assigned to scout a field. Automatic Tasks are created by the system according to the preset parameters. Such tasks can be linked to:

- Dates;
- NDVI changes;
- Crop Growth Stages;
- Agricultural Operations.

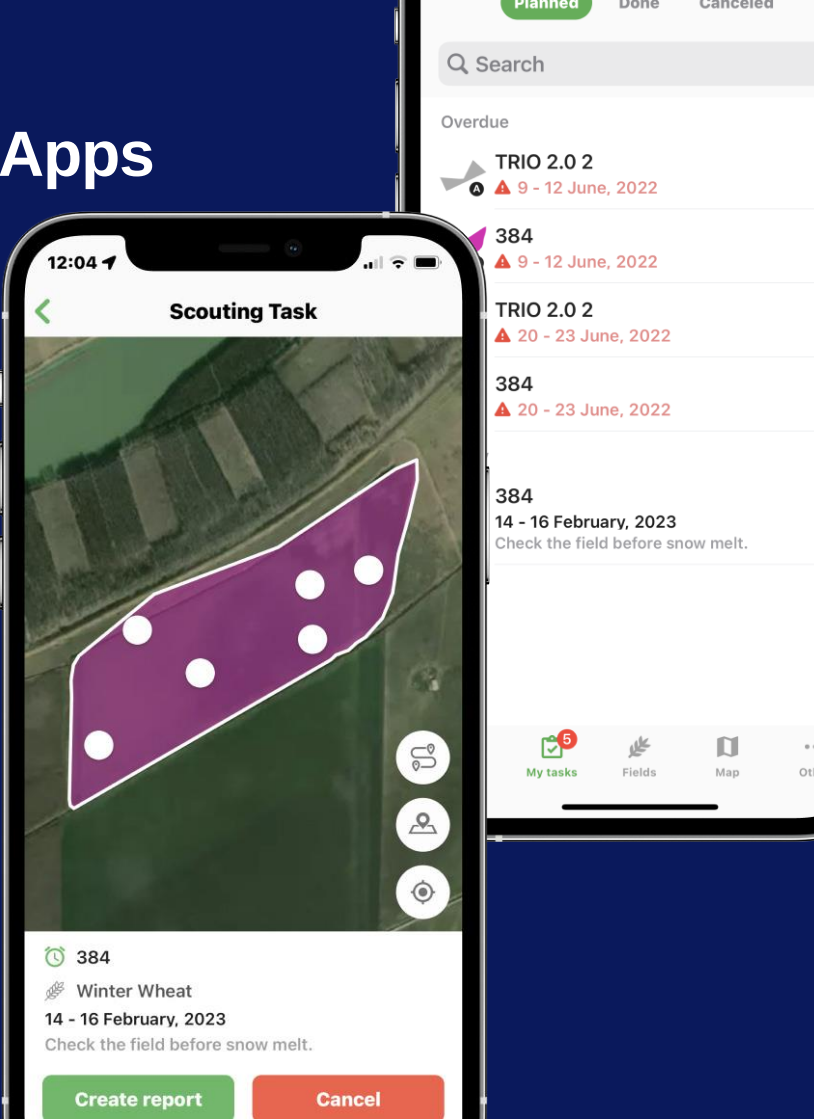
The Scouting tasks can be generated to check the fields prior to spraying. You can also set an inspection at a specific development stage. This feature is available for crops, growth stages for which are automatically recognized by the system, namely corn, sunflower, and winter wheat.


Monitoring center
Agro
Telematics
Map
Fields
More
Platform
3 test farm 2023
All machines
384
West Cluster / 3 test farm
Winter Wheat, 42.54 ha.
Dashboard
Soil
Agrooperations status
Agro operations
Nutrition plan
Scouting tasks
Scout reports
Notes
Alerts
Field history
Crop rotation
Area & shapes
Uploaded images
Analytics
Timeline
Image lab
Yield estimation
Download
Point 1
Point 2
Point 3
Point 4
Point 5
Point 6
100 m
Scouting task #104
Edit scouting task
DURATION
February 14, 2023 — February 16, 2023
STATUS
Planned
SEASON
2023
DESCRIPTION
Check the field before snow melt.
RESPONSIBLE USERS
Anna Cropwise
Regional Agronomist
agronomist@agro.com

Scouting in Mobile Apps

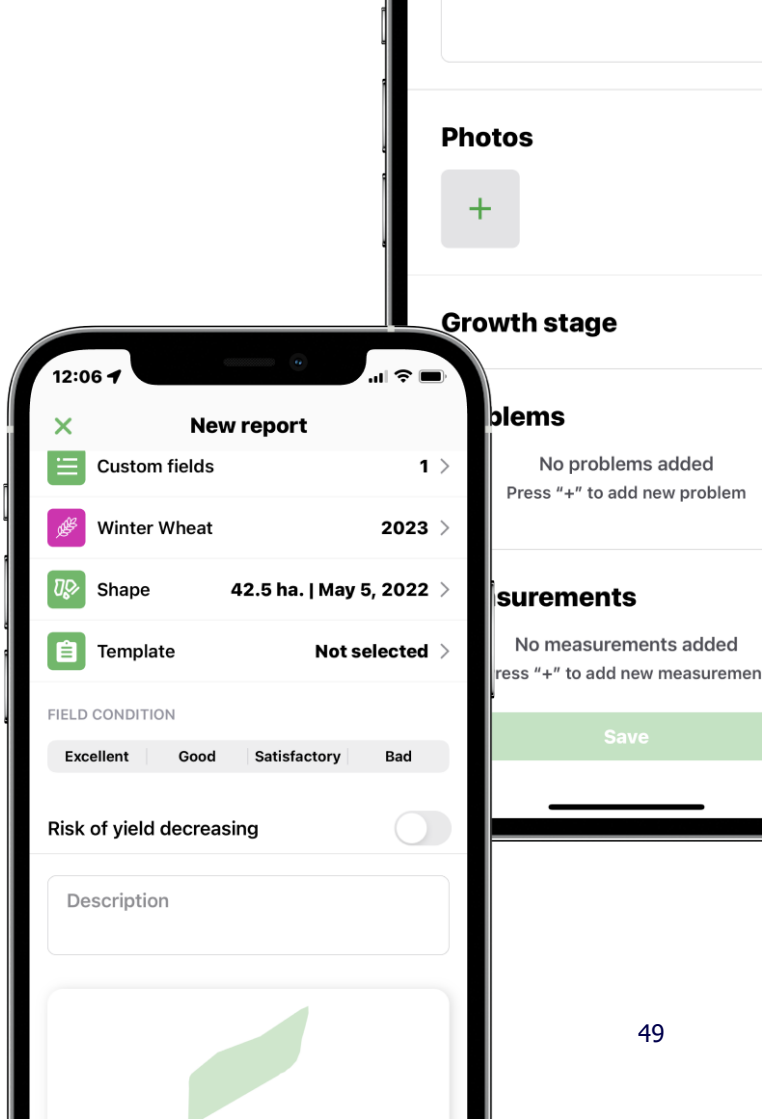
To increase the efficiency of crop data collecting during scouting we expanded the Scouting Reports toolkit in Cropwise Operations Mobile Apps. Scouting Tasks, an advanced form of the Scouting Report, Scouting Report Templates, the possibility to add Recommendations based on Scouting Reports are already available in the Apps for Android and iOS devices.

Inspect the fields according to the assigned tasks and add Scouting Reports with a description of each problem area to prevent problems in a timely manner.



The improved Scouting Report form in Cropwise Operations Mobile Apps helps the user to capture even more details of crop development. Consequently, there is an opportunity to identify and resolve the problems timely.

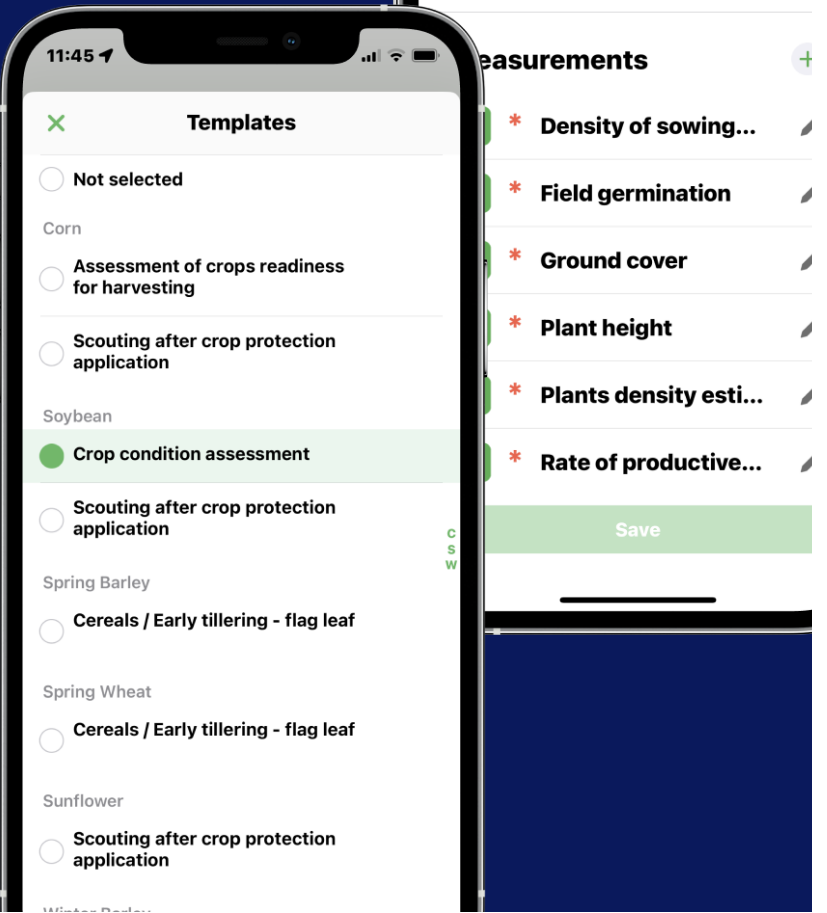
Select points on a field and document crop development details for the selected zones. You can add an unlimited number of photos for each point. Add detailed information about crops — from a growth stage to harvesting humidity. Assess the general condition of the field and the risks of declining yields. Make recommendations on work to be done to get a higher yield.



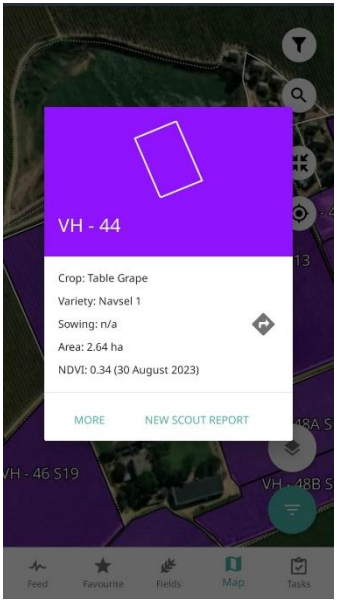
Scouting Report Templates

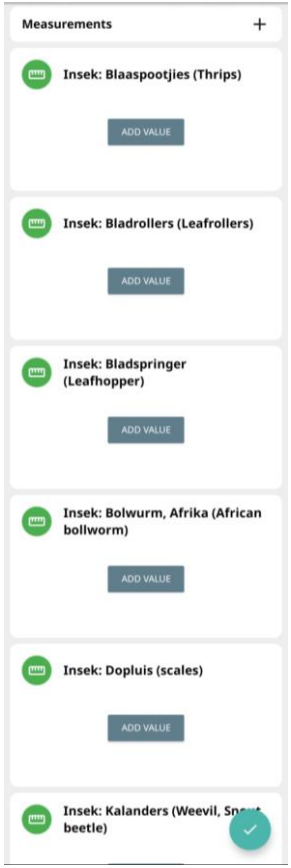
One can create Scouting Report templates for different goals with a set of specific measurements. You can set different templates to use for scouting before and after specific agricultural operations, before harvesting, etc. The tool helps to speed up, standardize, and simplify the scouting process.

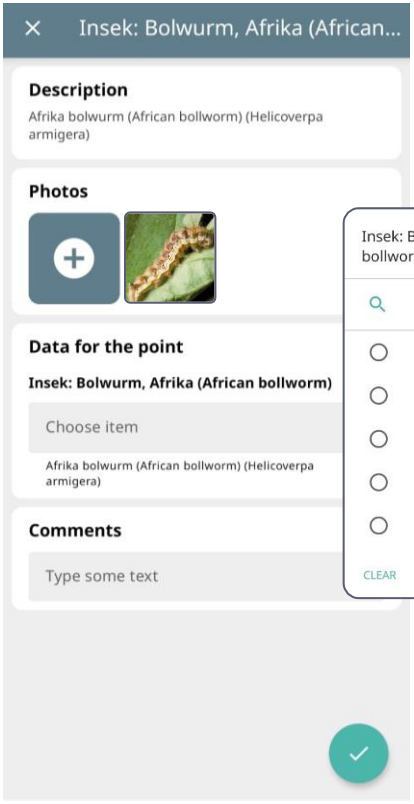
For example, to scout fields before harvesting, one can create a template with all required measurements for the crop – moisture content, ripeness percentage, etc. Selecting the template in the App the responsible person sees which measurements are required to be added. As a result, the collected data is very standard, that enables comparing it and making informed decisions.



Scouting Report Templates



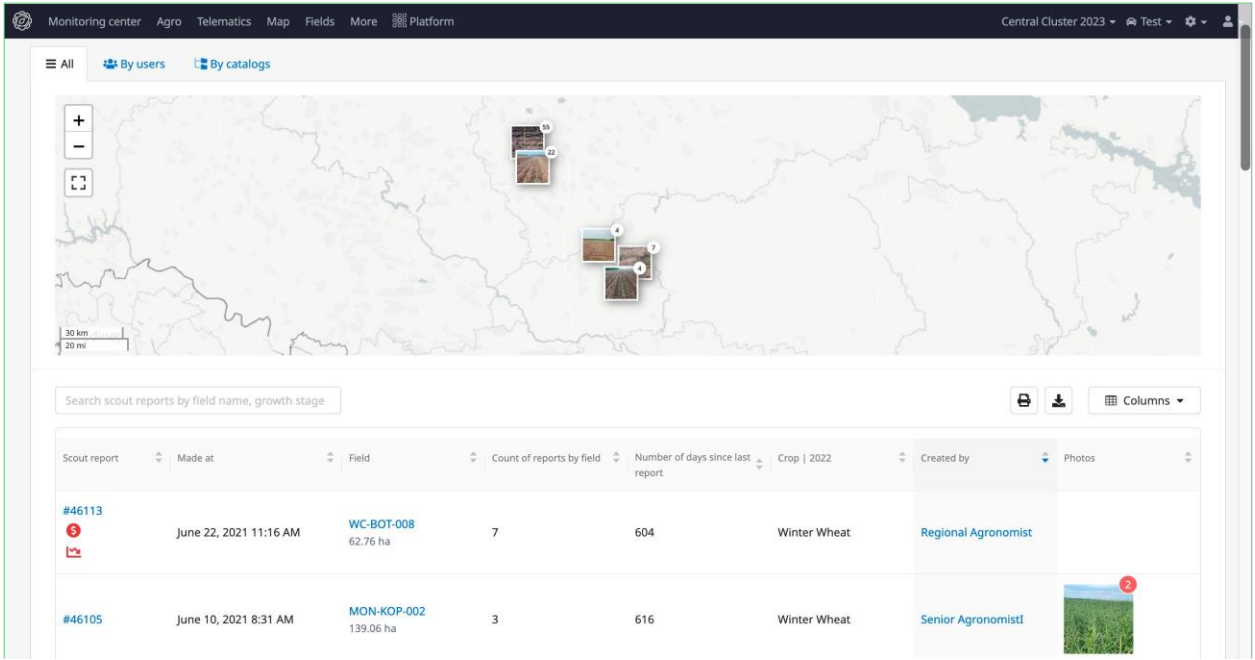




Scouting Reports Analytics

All Scouting Reports of your farm are gathered in one tab of the system. In a near real–time mode, track which fields are lagging in development, determine which factors have caused the problems and what can be done to prevent the losses.

Assign the Agronomist status to users and track their work results by area of responsibility: who created Scouting Reports and how many, how many fields and which ones were covered during certain time.



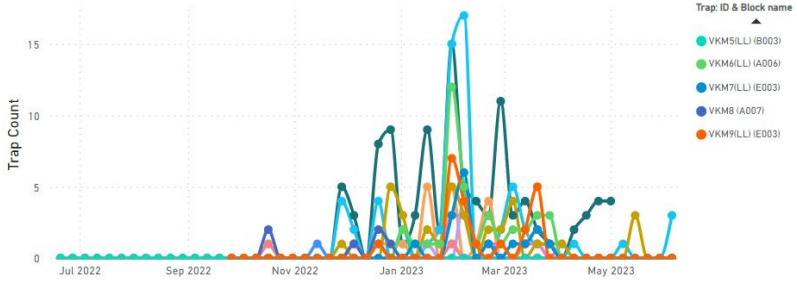
Pest Trap Monitoring

Keep record of your pest trap observations and trends across all your fields. We provide customisable reports on PowerBI to visualize observations and compile reports for auditing.

Trap ID	Pest name & Type	Blocks/fields
VKM1	VKM (DELTA)	F002
VKM10	VKM (DELTA)	A001
VKM11	VKM (DELTA)	C001A
VKM12	VKM (DELTA)	F003
VKM13	VKM (DELTA)	F001
VKM14	VKM (DELTA)	STOOR
VKM16(LL)	VKM (DELTA)	E004
VKM2(LL)	VKM (DELTA)	E001.1
VKM3	VKM (DELTA)	B002
VKM4	VKM (DELTA)	B006/B007
VKM5(LL)	VKM (DELTA)	B003
VKM6(LL)	VKM (DELTA)	A006
VKM7(LL)	VKM (DELTA)	E003
VKM8	VKM (DELTA)	A007
VKM9(LL)	VKM (DELTA)	E003

Trap locations

Trap Trendline

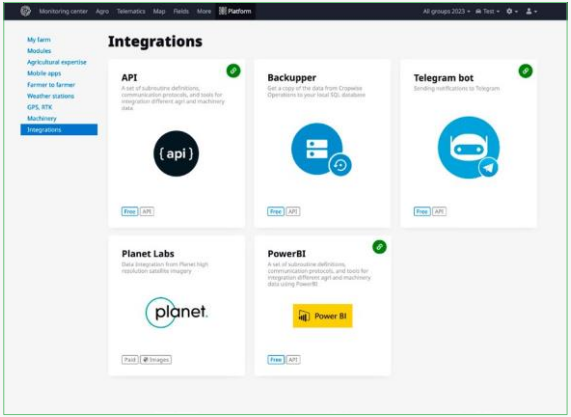


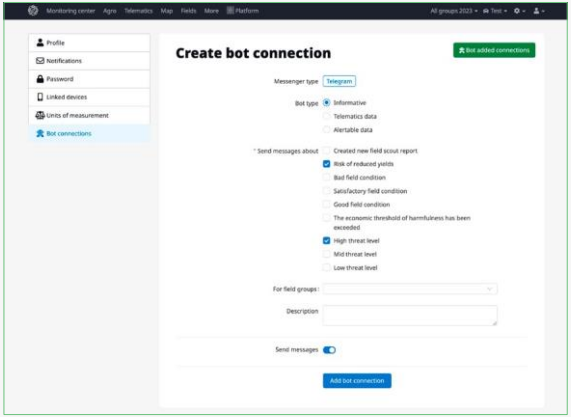
Pest name & Type	Trap: ID & Block name	05 Dec 2022	12 Dec 2022	19 Dec 2022
Karob / Lobesia	CB1 (A006)	0	0	0
OVV Vrugtevlieg	Y0239 A (B001)	0	0	0
	Y0239 B (B006/B007)	0	0	0
Sitrus Mealybug	SWL1 (E001.1)	3	0	0
	SWL2 (A006)	0	0	0
Sitrus Rooi Dopluis	CRS1 (E001.1)	20	5	0
SL / Rose Beetle	SL/RK1 (E001.1)	0	0	0
Verderflike Dopluis	VD2 (A001)	0	0	0
	VD3 (F003)	0	0	0
VKM (DELTA)	VKM1 (F002)	3	0	8
	VKM10 (A001)	0	0	0
	VKM11 (C001A)	2	0	4
	VKM12 (F003)	1	0	1
	VKM13 (F001)	0	0	1
	VKM14 (STOOR)	0	0	0
	VKM16(LL) (E004)	0	0	0
	VKM2(LL) (E001.1)	0	0	0
	VKM3 (B002)	0	0	0
	VKM4 (B006/B007)	1	0	1
	VKM5(LL) (B003)	0	0	1
	VKM6(LL) (A006)	0	0	0
	VKM7(LL) (E003)	0	0	0
	VKM8 (A007)	1	0	2
	VKM9(LL) (E003)	0	0	1

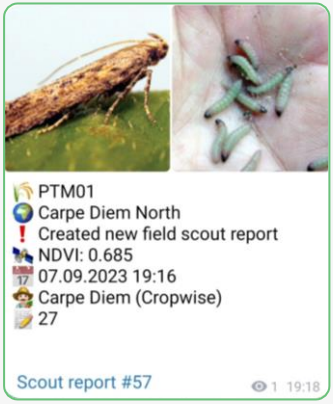
Control Crop Conditions on Telegram

Cropwise Operations can notify its users about specific crop condition parameters recorded in Scouting Reports using a Telegram chatbot.

Connect a chatbot in the system and activate it in Telegram. A minute after a new Scouting Report appears in the system, you will receive a notification about it. The message will also contain information about risks of yield decreasing and plant threats levels if any. Such messages can be received by one person or several people in a Telegram channel.







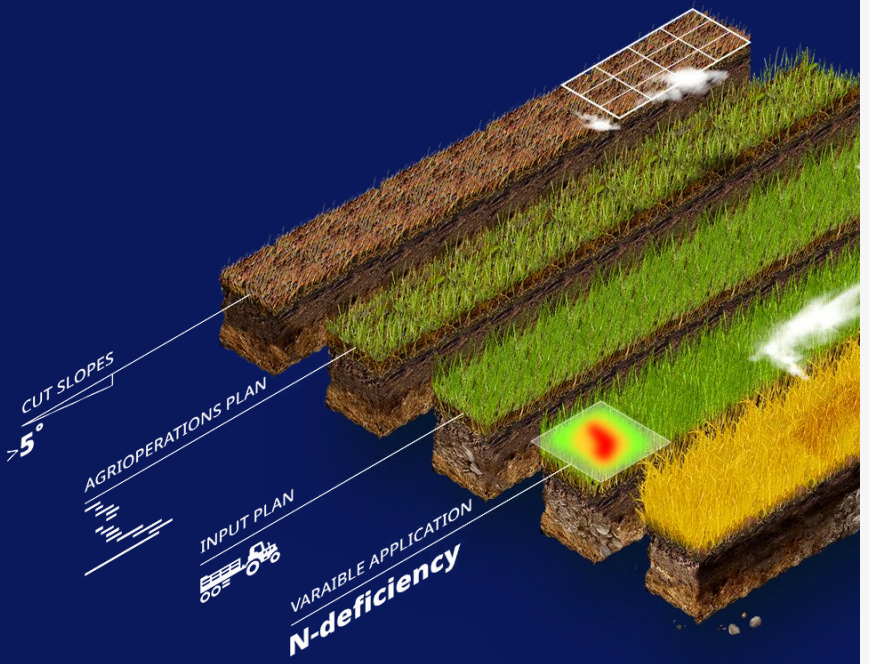
6

Agricultural Operations

Agricultural Operations

In the system, one can plan, document, and control agricultural operations, taking into consideration field relief, soil type and composition, weather, crop growth stages, and current condition of the fields.

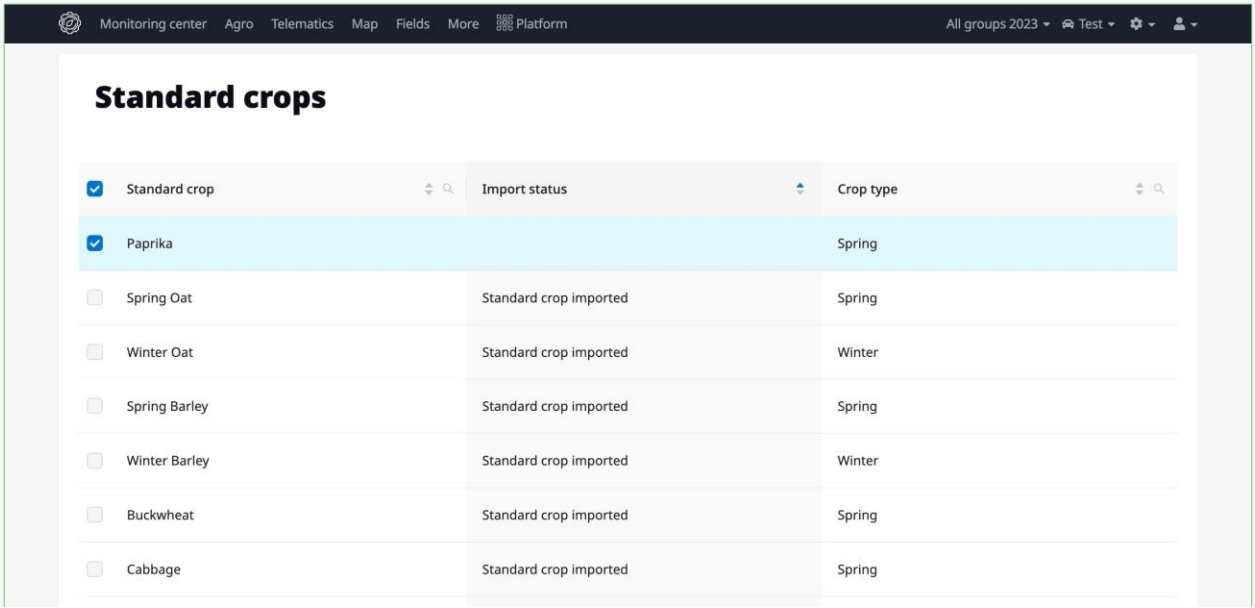
The advanced Agricultural Operations module will help you to make changes in the current agricultural works quicker and control different processes while performing sowing, fertilizers and CP products application, harvesting far more effectively.



Standard Crops Catalog Improvements

The Cropwise Operations team has improved and simplified the work with the standard crops catalog. The list of standard crops in each new account has been reduced from 50 to 10 the most typical crops for a region, such as spring and winter wheat, barley, rapeseed, sunflower, corn, pea, potatoes.

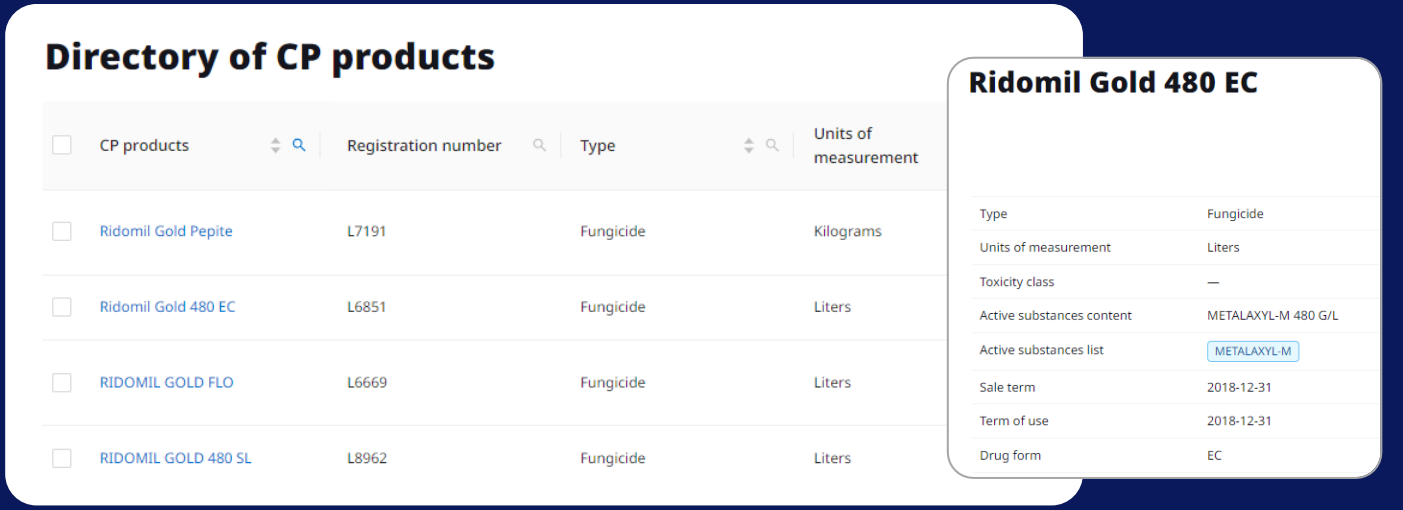
The rest of the crops can be imported from the global database. The lists of typical crops by country will be also available in the system. The standard crops can now be deleted from the Cropwise Operations accounts.



Global CP Products Database Integration

This season Cropwise Operations enables its users to import CP products from the global database — the list of standard products officially registered in a specific country. The tool helps to unify the catalog and get the system recommendations on the CP products use that will help users to adhere to the CPP application technology and ensure effective crop protection.

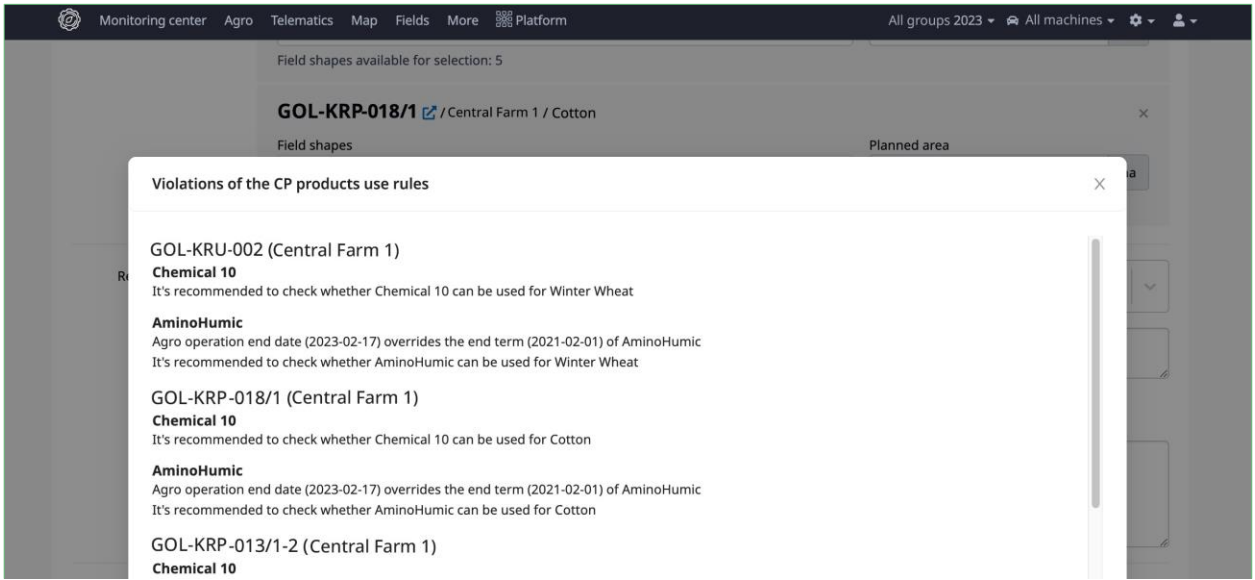
The users can add a required item to the Catalog in the CP products tab. Additionally, there is an option to fast–add a CP product on the Agri Plans and Agri Operations creation pages.



CP products Verification in Agri Operations

The unified list of CP products imported from the global database is a complete must–have for getting the system recommendations on the pesticide application practices.

After saving a CP product application operation the systems checks if the requirements for using a certain CP product are not violated. At the moment the validations by crops and a CP product expiration date are available. In total there will be around eleven validation parameters. Unless the CP product meets certain requirements, the system will display a warning. The user can follow it and make changes to the operation or ignore the warning.



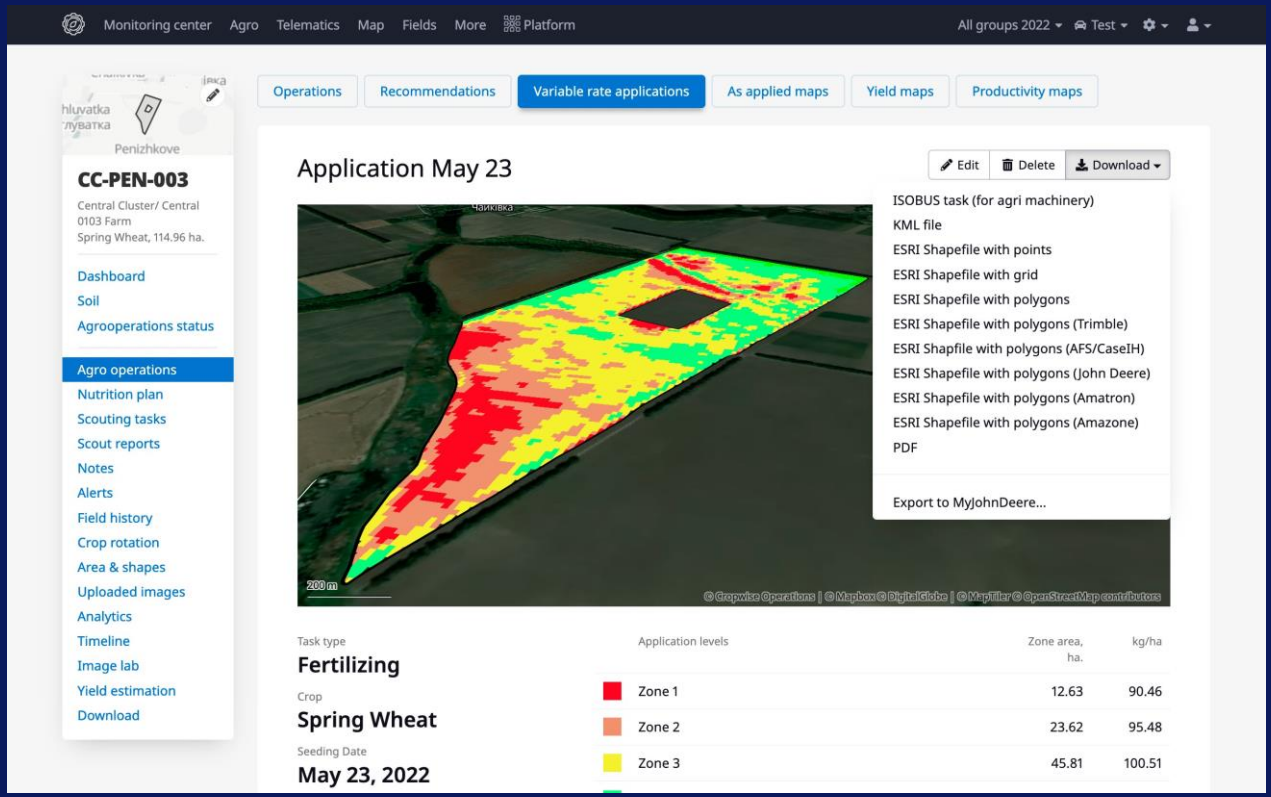
VRA Builder

Even a good field can vary by productivity zones. The VRA builder tool enables adjusting the rates of seeds, fertilizers, and CP products depending on the soil type and composition, the needs of each field zone, and the planned yield. It helps to optimize costs and get higher economic effect from each area of the field.

The system differentiates productivity zones in fields based on the analysis of historical satellite images, vegetation, UAV images, productivity, and soil texture maps as well as the distribution of macro– and micronutrients in the soil according to the soil tests.

Afterwards Cropwise Operations generates recommendations on the optimal application rates for each zone. At the same time the user can manually determine the application rates of seeds, fertilizers, CP products for each zone disregarding the system recommendations.

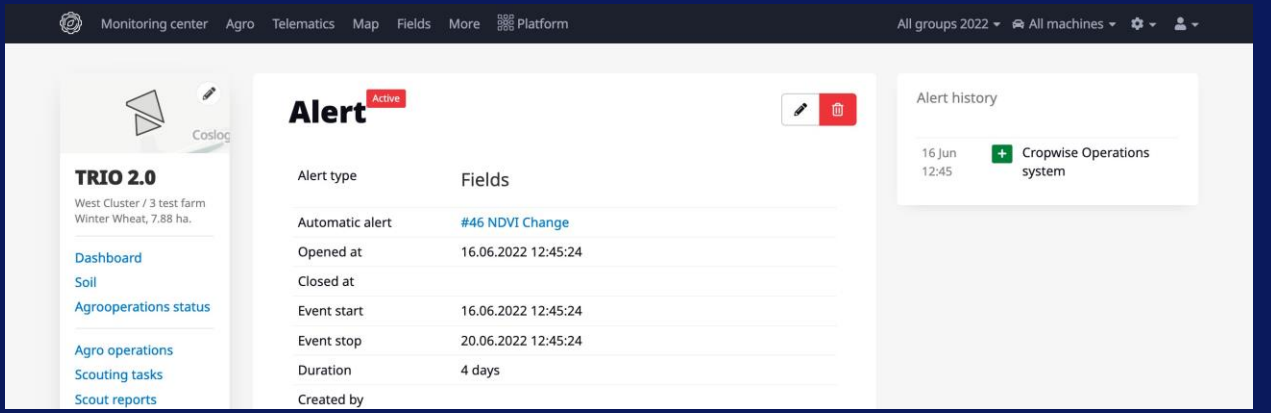
Cropwise Operations users can download the VRA task map to a removable data storage device in multiple formats (ISOBUS, ESRI Shapefile) and connect it to the on–board computer of their machinery (Amazone, Amatron, CaseIH, John Deere, Trimble) or export it to their MyJohnDeere account directly.


Monitoring center
Agro
Telematics
Map
Fields
More
Platform
All groups 2022
Test
Penizhkove
CC-PEN-003
Central Cluster/ Central
0103 Farm
Spring Wheat, 114.96 ha.
Dashboard
Soil
Agrooperations status
Agro operations
Nutrition plan
Scouting tasks
Scout reports
Notes
Alerts
Field history
Crop rotation
Area & shapes
Uploaded images
Analytics
Timeline
Image lab
Yield estimation
Download
Operations
Recommendations
Variable rate applications
As applied maps
Yield maps
Productivity maps
Application May 23
Edit
Delete
Download
ISOBUS task (for agri machinery)
KML file
ESRI Shapefile with points
ESRI Shapefile with grid
ESRI Shapefile with polygons
ESRI Shapefile with polygons (Trimble)
ESRI Shapfile with polygons (AFS/CaseIH)
ESRI Shapefile with polygons (John Deere)
ESRI Shapefile with polygons (Amatron)
ESRI Shapefile with polygons (Amazone)
PDF
Export to MyJohnDeere...
200 m
Task type
Fertilizing
Crop
Spring Wheat
Seeding Date
May 23, 2022
Application levels
Zone area, ha.
kg/ha
Zone 1
12.63
90.46
Zone 2
23.62
95.48
Zone 3
45.81
100.51

Automatic Alerts

The Automatic Alerts tool helps Cropwise Operations users to track abnormalities in crop development and prevent spreading of various problems. One can set up the following alerts: the Vegetation Index (NDVI) and Yield Estimation change, the NDVI exceeding or dropping below a certain threshold, the potential risk of disease spreading. There are also notifications about fields where crops have not been harvested, and alerts about crop threats.

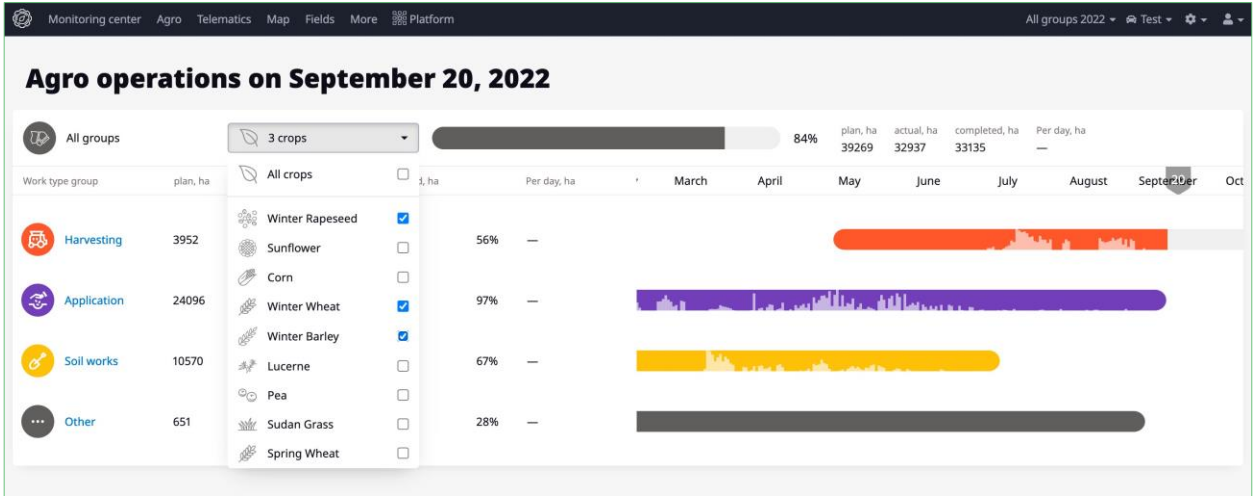
The system will generate alerts after checking all the required conditions previously set by the user in the alert settings. The responsible users will receive notifications about the event via email, SMS, or Telegram messages. To receive the messages via Telegram the user should activate the connection to the chatbot. Telegram notifications are clearer and much more informative.



Work Report

The Report displays the latest data on processed and completed areas for all the agricultural operations that are carried out in a field group. The system is constantly updating the data throughout the day.

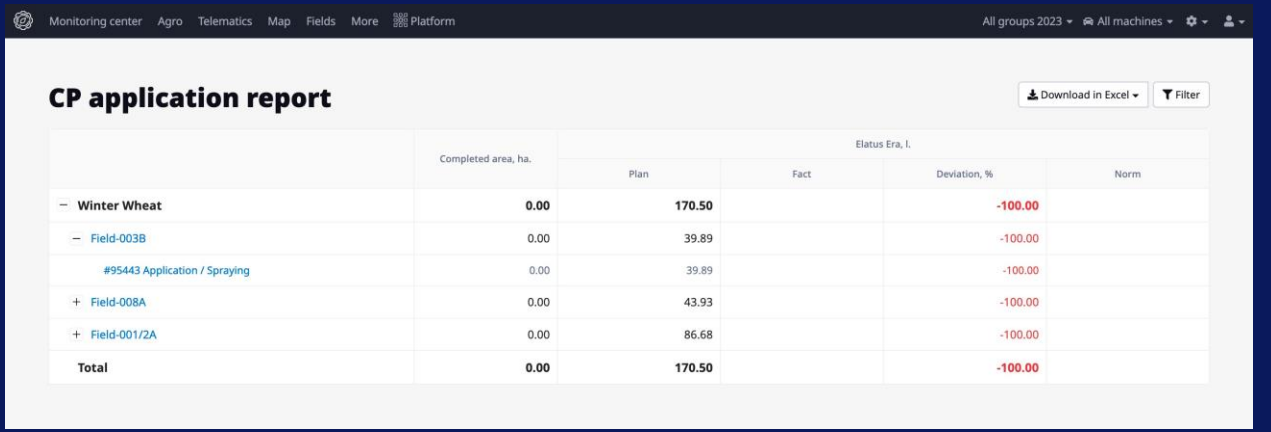
The data is grouped by crops. The information by work groups (application, harvesting) is displayed by default for the selected field group. The data by work types (spraying, sowing, etc.) is displayed separately for the field group and fields. On the charts one can track the dynamics of the current seasonal works and compare the results with the previous seasons.



Application Report

The Report on seeds, fertilizers, and CP products application is formed using the operations results of the Application work type group. For the system to create the Report you should specify the planned and completed application rates of seeds, fertilizers and CP products in agricultural operations.

The Report displays data on the completed work area, planned and completed application rates as well as the deviation percentage between the total number of elements planned for application, and the actual application for a specific crop as of a selected time frame.

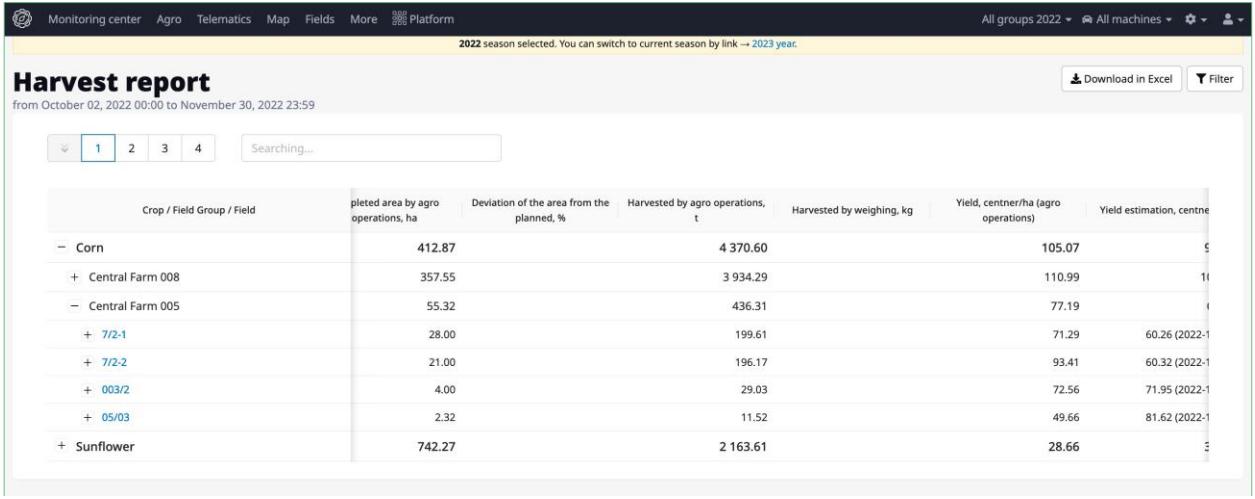


	Completed area, ha.	Elatus Era, l.			
		Plan	Fact	Deviation, %	Norm
− **Winter Wheat**	**0.00**	**170.50**		**-100.00**	
− Field-003B	0.00	39.89		-100.00	
#95443 Application / Spraying	0.00	39.89		-100.00	
+ Field-008A	0.00	43.93		-100.00	
+ Field-001/2A	0.00	86.68		-100.00	
Total	**0.00**	**170.50**		**-100.00**	

Harvest Report

The Report provides data on harvested areas, crops and crop yields by field groups. The data is grouped by crops. The data could be entered manually or integrated from the Harvesting operations and machine weighings.

The user can configure the harvest data integration from agricultural operations into the Report by setting the appropriate data source mode in the company's account settings.

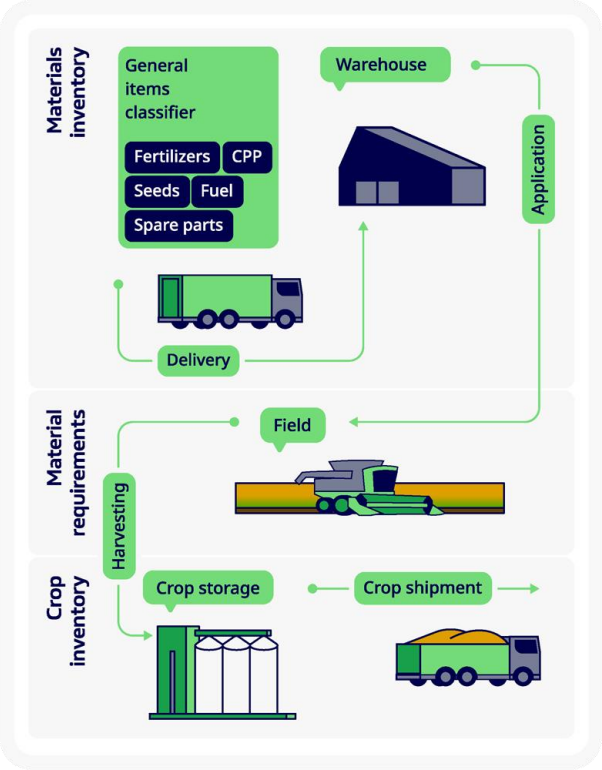


Warehouse and Stock Management (WMS)

The feature enables growers to streamline their farm's inventory items, monitor and regulate inventory movement, and conveniently control stock levels from a centralized location.

- create a single directory of inventory items on the farm (CP products, fertilizers, seeds, spare parts, fuel, crops, etc.),
- record purchase, relocation, and write–off operations,
- plan seasonal inventory items requirement,
- monitor actual inventory stock,
- track all the materials issued to agronomists, drivers, and other personnel

The Farm Warehouse and Inventory Management tool was implemented first for growers in Poland and Ukraine. However, it is now available to all Cropwise Operations users upon request.



Available Features

Advanced Measurement Units Catalog

In the system both default units (for measurement of weight, volume, length, etc.), and custom units (box, bag, pack, etc.) will be available. Also, the conversion rules of one measurement unit into another will be developed.

Warehouses

The lists of storing places corresponding to the company's warehouse structure will be created in the system. They will also be used in the documents demonstrating the Inventory movements.

Register of Inventory Names

The system will allow the users to register different types of Inventory and goods, such as seeds, fertilizers, CPP, spare parts, agricultural equipment, and so on.

New Documents

Three new documents will be available to demonstrate Inventory movement:

- Incoming
- Outgoing
- Internal movement

7

Telematics and Integrations

Telematics

The Telematics module allows operational monitoring and effective control of the machinery and fields in one system.

The users can monitor fields work progress in real time:

Processed areas, how much is left to cover, what is the current state of fields.

Complete information about each machinery unit:

General data, assigned tasks, and various alerts on unauthorized tasks, speed limit violations, fuel consumption, etc.

Full control of machinery is available:

Location, speed, daily work plan, covered area, movement and stops duration, fuel consumption, violations, drivers, etc.

Comparison of the work quality with a crop condition:

Respond to problem areas in a timely manner and adjust the technological process for higher efficiency.

New Features

- Monitoring Center for Drivers
- Improved form of GPS sensors configuration
- Report on sensor recalculations launched by the user
- Comparative table of raw and counted data for sensors
- As–Applied and Yield maps based on data from machine GPS tracker sensors
- Detailed statistics on drivers' work on the task page
- The Webdispecink monitoring system and all available versions of the iAZS API integration
- Machinery Data Integration Improvements
- **Bulk downloading of VRA task–maps for several fields**
- The Telematics App Improvements:
  - **Building a route to a field from a machine's task,**
  - Drivers' access to the App,
  - **Push notifications on assigned task to drivers.**

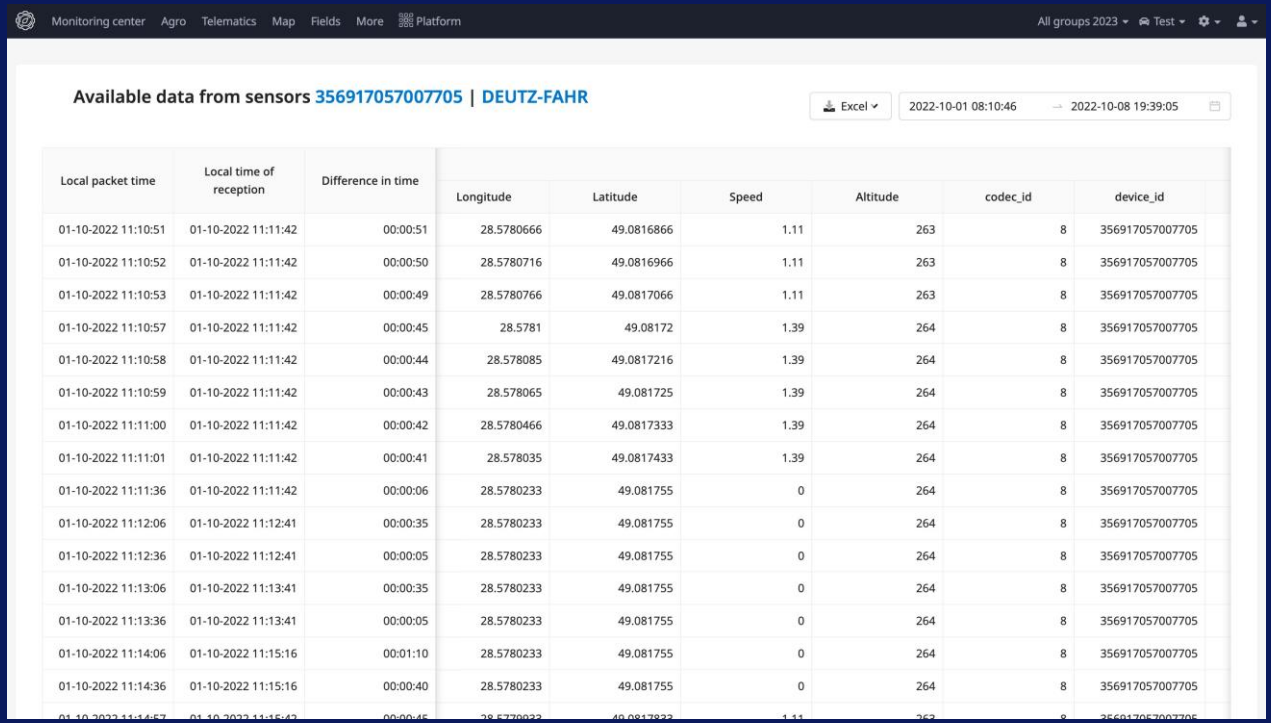
GPS Tracker Sensors Data

The Cropwise Operations team keeps constantly working on improving data quality that the system receives from different sensors connected to GPS trackers and on its displaying and analysis in the system.

We have improved a form of GPS sensors configuration and the sensor history values page. The tools became more consistent, faster, and more user–friendly.

Additionally, the team has launched the data filtering feature that enables users to exclude false and incorrect values from all types of sensors supported by the system without using any complex calculations. The report on sensor recalculations launched by the user is now available as well.

This season as–applied and yield maps based on data from machine GPS tracker sensors are also available.



Available data from sensors 356917057007705 | DEUTZ-FAHR

Excel | 2022-10-01 08:10:46 → 2022-10-08 19:39:05

Local packet time	Local time of reception	Difference in time	Longitude	Latitude	Speed	Altitude	codec_id	device_id
01-10-2022 11:10:51	01-10-2022 11:11:42	00:00:51	28.5780666	49.0816866	1.11	263	8	356917057007705
01-10-2022 11:10:52	01-10-2022 11:11:42	00:00:50	28.5780716	49.0816966	1.11	263	8	356917057007705
01-10-2022 11:10:53	01-10-2022 11:11:42	00:00:49	28.5780766	49.0817066	1.11	263	8	356917057007705
01-10-2022 11:10:57	01-10-2022 11:11:42	00:00:45	28.5781	49.08172	1.39	264	8	356917057007705
01-10-2022 11:10:58	01-10-2022 11:11:42	00:00:44	28.578085	49.0817216	1.39	264	8	356917057007705
01-10-2022 11:10:59	01-10-2022 11:11:42	00:00:43	28.578065	49.081725	1.39	264	8	356917057007705
01-10-2022 11:11:00	01-10-2022 11:11:42	00:00:42	28.5780466	49.0817333	1.39	264	8	356917057007705
01-10-2022 11:11:01	01-10-2022 11:11:42	00:00:41	28.578035	49.0817433	1.39	264	8	356917057007705
01-10-2022 11:11:36	01-10-2022 11:11:42	00:00:06	28.5780233	49.081755	0	264	8	356917057007705
01-10-2022 11:12:06	01-10-2022 11:12:41	00:00:35	28.5780233	49.081755	0	264	8	356917057007705
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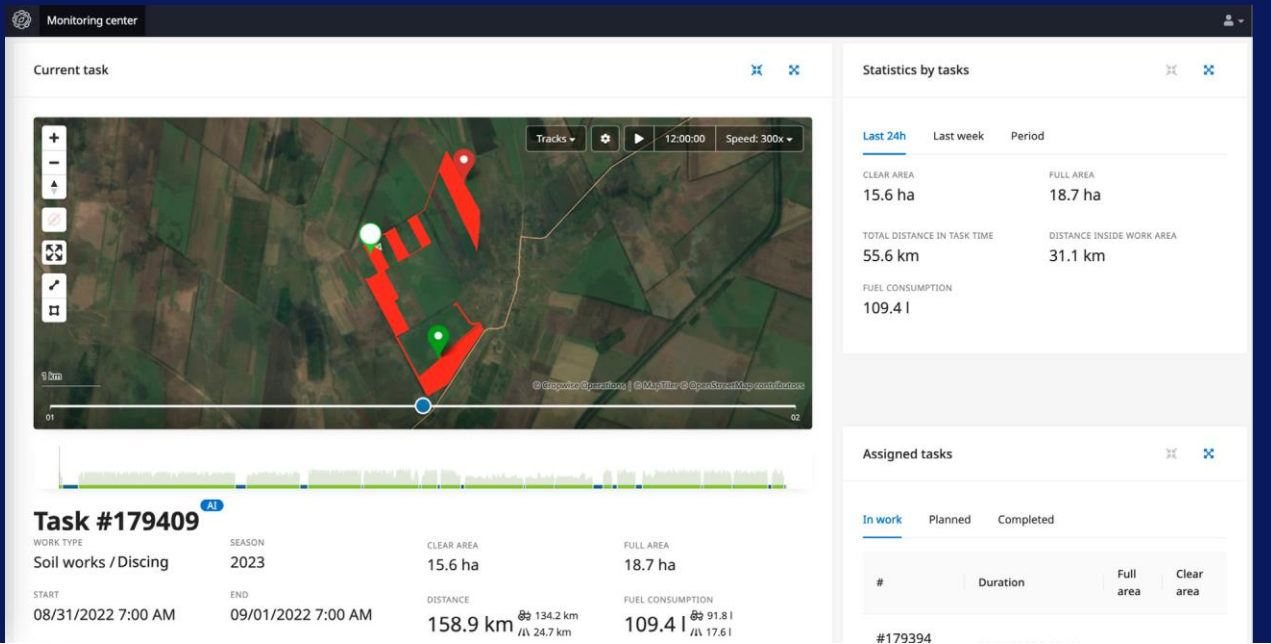
01-10-2022 11:13:06	01-10-2022 11:13:41	00:00:35	28.5780233	49.081755	0	264	8	356917057007705
01-10-2022 11:13:36	01-10-2022 11:13:41	00:00:05	28.5780233	49.081755	0	264	8	356917057007705
01-10-2022 11:14:06	01-10-2022 11:15:16	00:01:10	28.5780233	49.081755	0	264	8	356917057007705
01-10-2022 11:14:36	01-10-2022 11:15:16	00:00:40	28.5780233	49.081755	0	264	8	356917057007705

Drivers' Monitoring Center

The Cropwise Operations team has extended the drivers' access rights in the system.

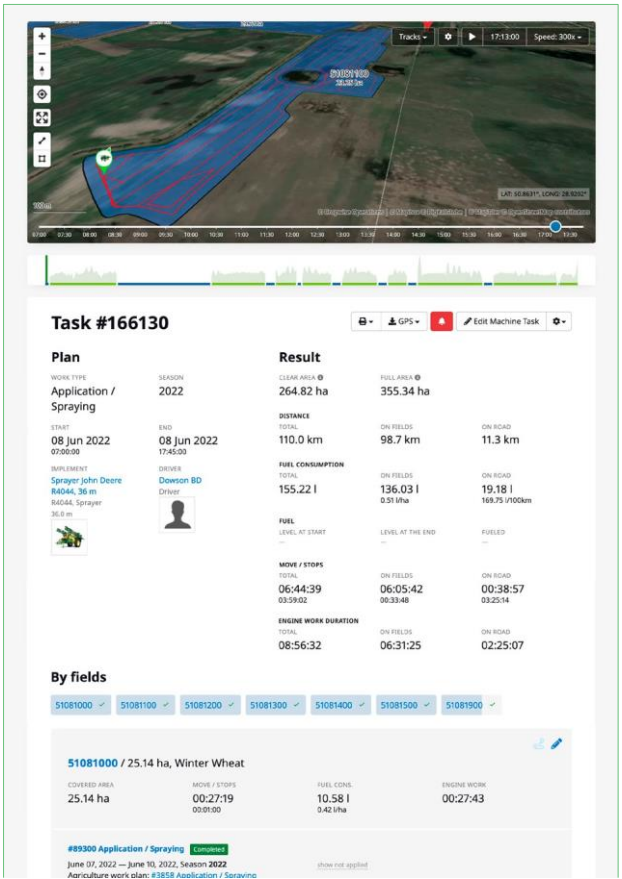
This season such users will have their own Monitoring Center on the web–based version of Cropwise Operations: one page with assigned tasks and statistics for the past selected period will be available. Additionally, the drivers will have access to the Telematics App and will receive push notifications on assigned tasks.



Machine Task Page

This season the Cropwise Operations users will get more useful information on the machine task page. At the moment the following new features are available: the machine movement chart and additional data on fuel, such as fuel level at the beginning and at the end of the task, information on refueling during the task.

Additionally, one can get the detailed statistics on drivers' work, such as completed area for each field. Information on the driver's working time is sourced from the driver's personal identifier sensors.



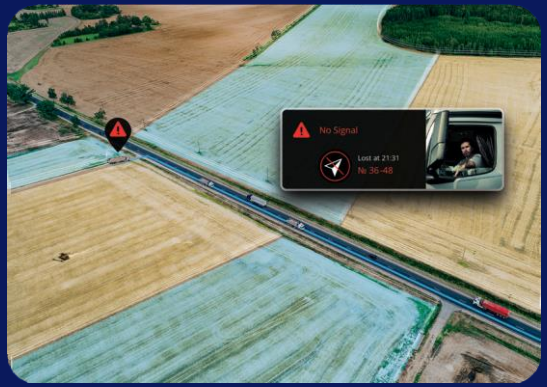
Alerts

The Alerts tool helps to track all violations in work of machinery and drivers, fix various kinds of problems with machines, implements, GPS tracker sensors. Two types of alerts are available in the system — automatic and manually created.

Automatic alerts are generated based on the parameters preset by the users. The signals are transmitted by the sensors installed on machinery and when a machine or equipment reaches the parameters, such as maximum speed, minimum distance, etc., the notification is sent to the user. Such alerts are triggered in the system automatically without any additional actions.

Manual alerts cannot be generated based on the signals from any equipment. Such alerts require monitoring and actions from the responsible persons. For example, mistakes in agricultural operations planning or unusual situations e.g., driver suddenly got sick during work and so on.

Violation of Speed Limit
5-15 km/h
17 km/h


No Signal
Lost at 21:31
№ 36-48

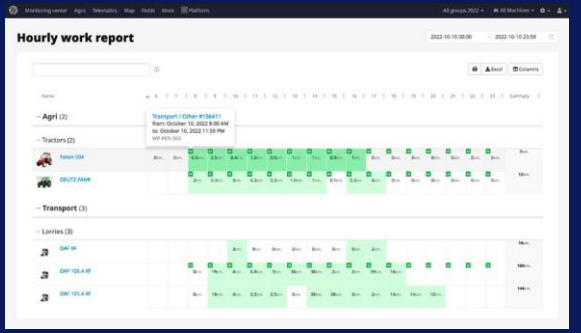
Working on Field without Task
Start 14:25
36 min

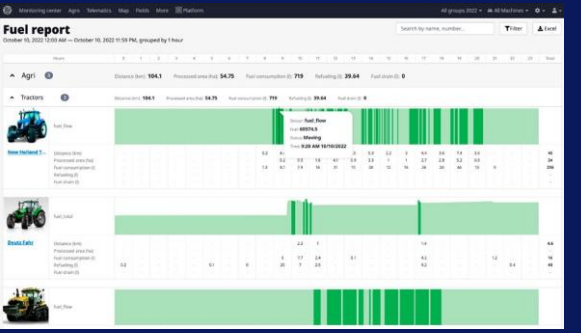
Geofencing
Left at 14:34
№ 35-102

Reports

Would you like to control your machinery much more efficiently and receive accurate data on harvesting and sowing to respond to all problems in time? Use the machinery performance reports of the Telematics module generated based on data from GPS trackers.

Reports will help you to analyze the machinery workload, obtain data on the machine work results per hour and day, machinery maintenance, active alerts, monitor fuel consumption by each vehicle remotely, identify machines and implements that are used inefficiently, and plan work more rationally.

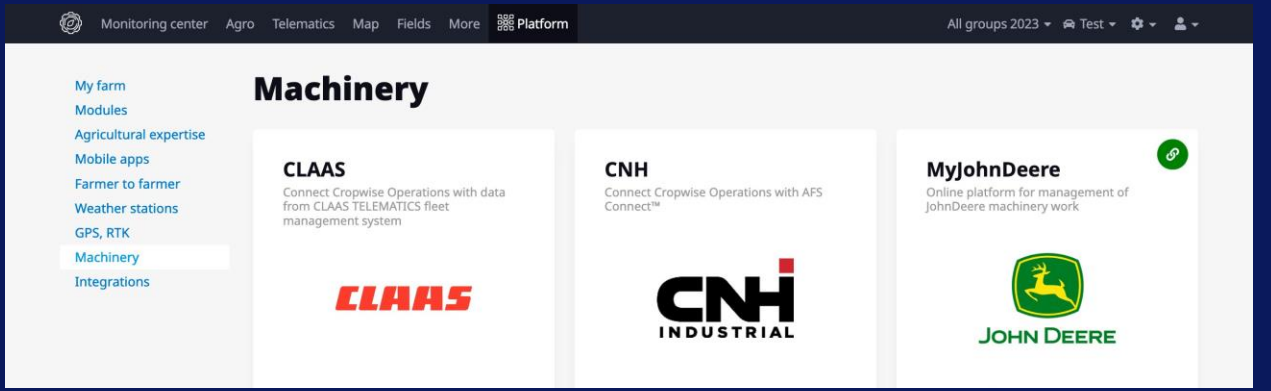




Machinery Integration

We are constantly working on improving the Cropwise Operations integration with third–party systems, products, and services to collect all the data the users need in one place and in a convenient form.

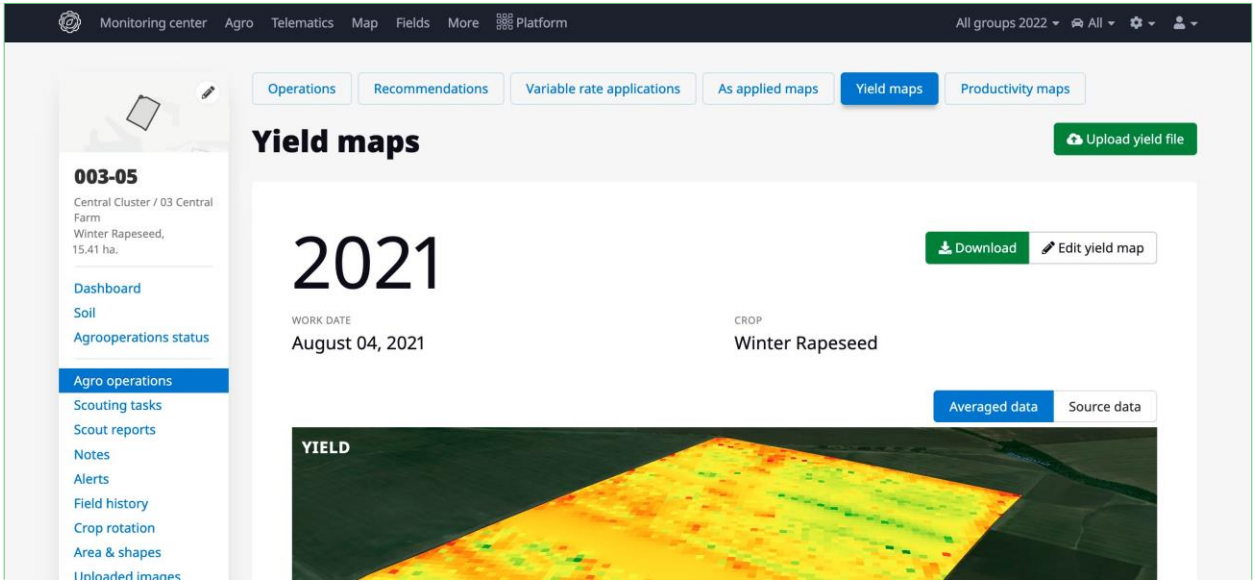
At the moment the users can synchronize data on fields, agricultural operations, telematics, yield, and as–applied maps with services from CLAAS, CNH Industrial, John Deere, Raven Industries, SkyFMS, and iAZS.



As-Applied and Yield Maps

Upload As-Applied and Yield maps into Cropwise Operations from your machinery to visually assess the distribution of seeds, fertilizers, and CP Products in fields, obtain yield data from each hectare, and identify productive and problematic areas.

The user can add maps from the Agleader, Case IH, CLAAS, Hexagon, Farm TRX, John Deere, New Holland, Raven, and other machinery. By the start of a new season the team has improved the tool with the abilities to save multiple as–applied and yield maps at once in one click, filter maps by raw data, attach files to the maps, get total data on the maps imported from John Deere and Raven.



8

Mobile apps

Apps for iPhone and iPad users

Cropwise Operations
Satellite Monitoring, Agricultural Operations, Scouting (the extensive toolkit for conducting field inspections)

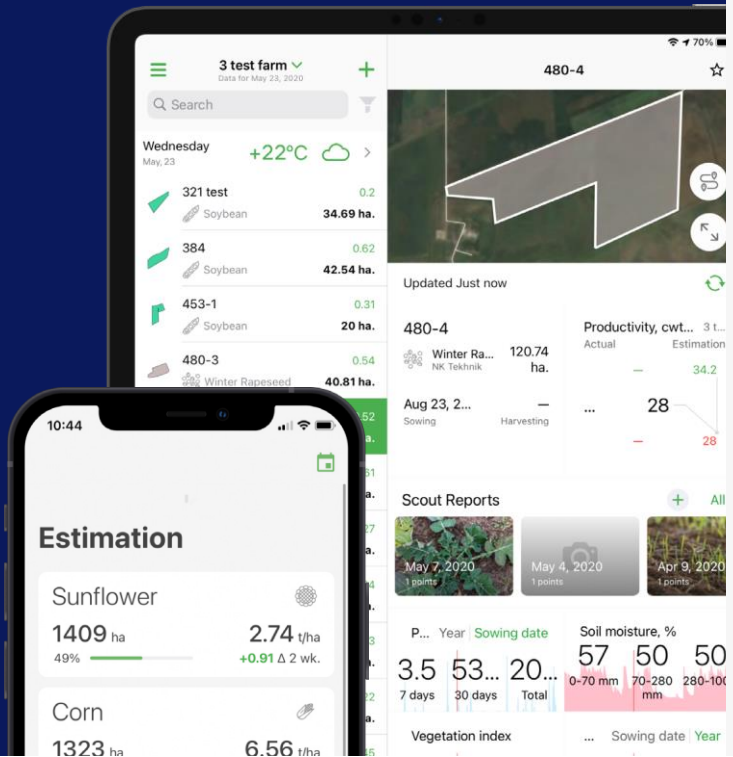
Telematics
Machinery work management in real time

Yield
Tracking of yield forecast and crop harvesting progress

Weighings
Recording trucks weight on weighbridges and quick transfer of the harvested yield data to the system

Download on the App Store

Mobile App for iPhone and iPad



Apps for Android devices users

Cropwise Operations
Satellite Monitoring, Agricultural Operations, Scouting (the extensive toolkit for conducting field inspections)

Telematics
Machinery work management in real time

Yield
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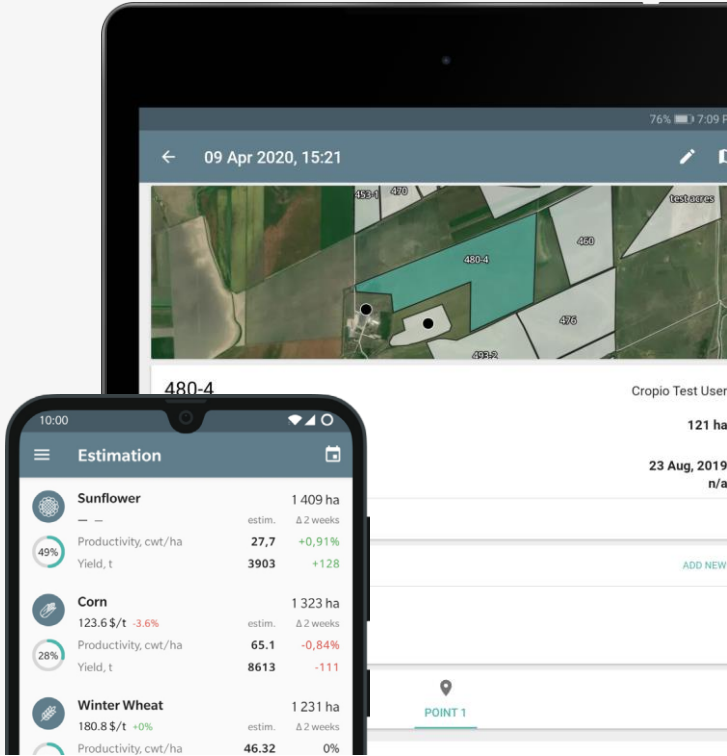
Weighings
Recording trucks weight on weighbridges and quick transfer of the harvested yield data to the system

GET IT ON Google Play

Mobile App for Android



9 Pricing

Pricing

The following fees apply until 28 February 2024.

Crop group	Standard tariff
Winter small grain (cereals) (wheat, barley, oats, canola, lupins, medics, lucerne, grazing, etc.) **Summer row crops** (maize, soyabean, sunflower, etc.) **Other field crops** (cotton, sugarcane, tobacco, etc.)	**R18/ha/year**
Potatoes **Vegetables**	**R50/ha/year**
Orchards, vineyards and tree nuts	**R50/ha/year**
Planet Labs daily satellite imagery (3x3m)	**R18/ha/year**

- 60-day free trial period applies
- A Minimum annual subscription fee of R4900/client/year applies
- All fees are exclusive of VAT
- Special fees and incentives are available for Syngenta crop protection clients (available on request)

Cropwise Operations

syngenta digital

Reach out to our digital support specialists for online or on-farm assistance

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