



A.I. based technology to increase palm oil yield
and sustainability in Malaysia

Towards Digitalisation of Malaysian Sustainable Palm Oil

Sustainability drivers

Yield improvement

- Predictive analytics to determine how to increase yield keeping high sustainability standards and optimum fertilization

Predictive Pest & Disease Management

- Anticipating pest and disease risk to monitor and treat more effectively, avoiding damages and reducing pesticides use



Technology: Big Data & Artificial Intelligence



Open Data



Multiple
Indexes



Geo Data



Weather

Existing Customer Data



Age, variety,
Yield



Management,
harvesting



Treatments
& Inputs

Artificial Intelligence

- Genetic algorithms
- Predictive algorithms
- Optimization algorithms

Adapted to Palm Oil Forestry



Smart Actions

- Optimization
- Recommendations and planning
- Dynamic modelling and updates

WHAT IF Analysis

- Scenarios
- Scalable
- Actionable

Target Definition &
Data Analytics

Knowledge
Generation

Value
Creation

Beyond Precision Agriculture → Predictive Agriculture

A.I. and Predictive Analytics is the final solution to provide recommendations to maximize productivity

5 USE CASES OF AI + ROBOTICS IN AGRICULTURE

ANALYZING SATELLITE IMAGES



IN-FIELD MONITORING



ASSESSING CROP/SOIL HEALTH



PREDICTIVE ANALYTICS



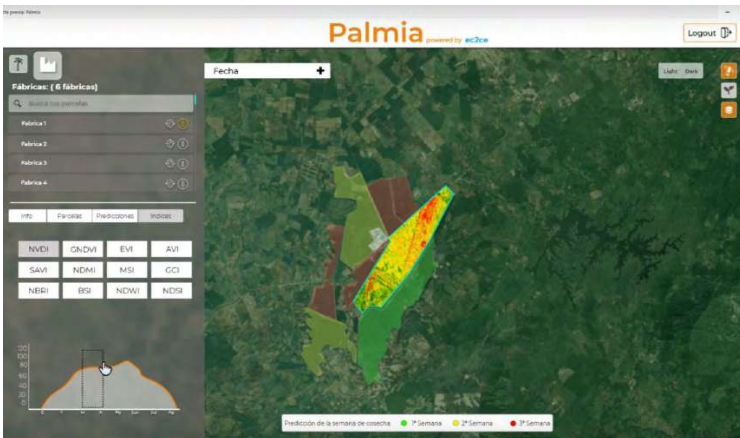
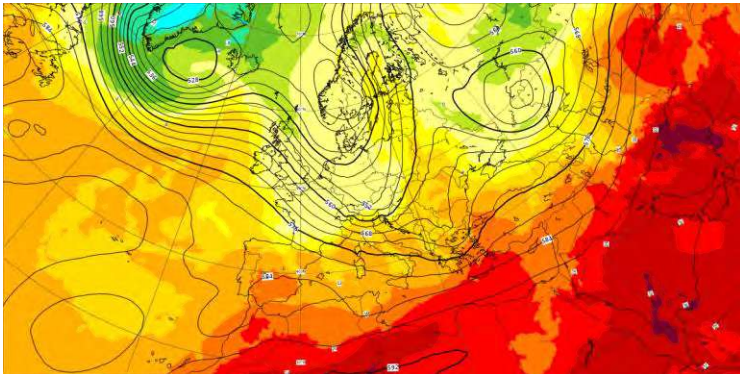
CBINSIGHTS



AGRICULTURAL ROBOTS



Numerical Data Bases



- Farms supporting historical data
- Varieties, age of tree, planting density
- Historical Yield figures
- Location



Open Data

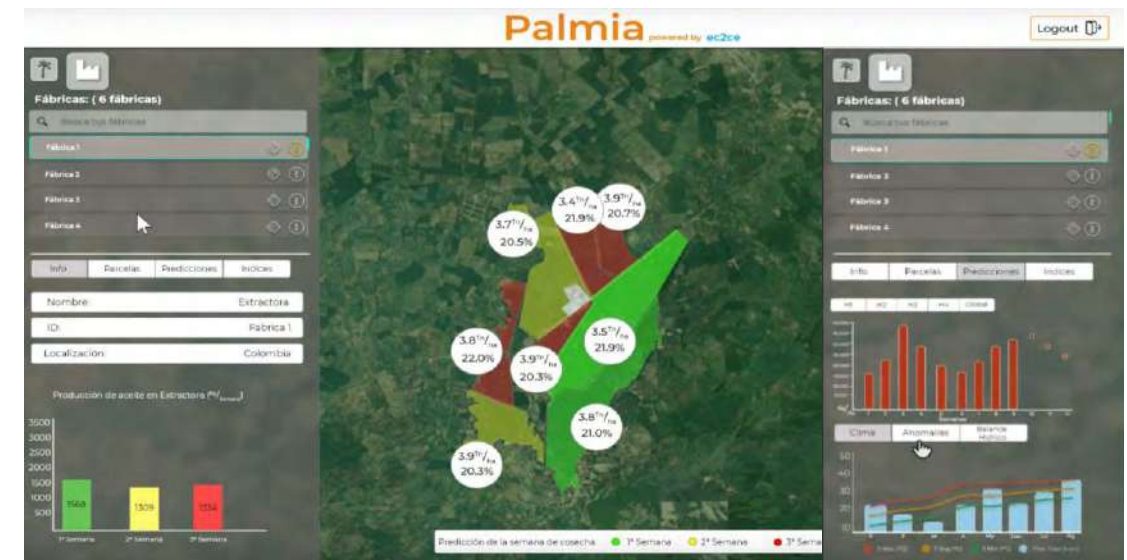
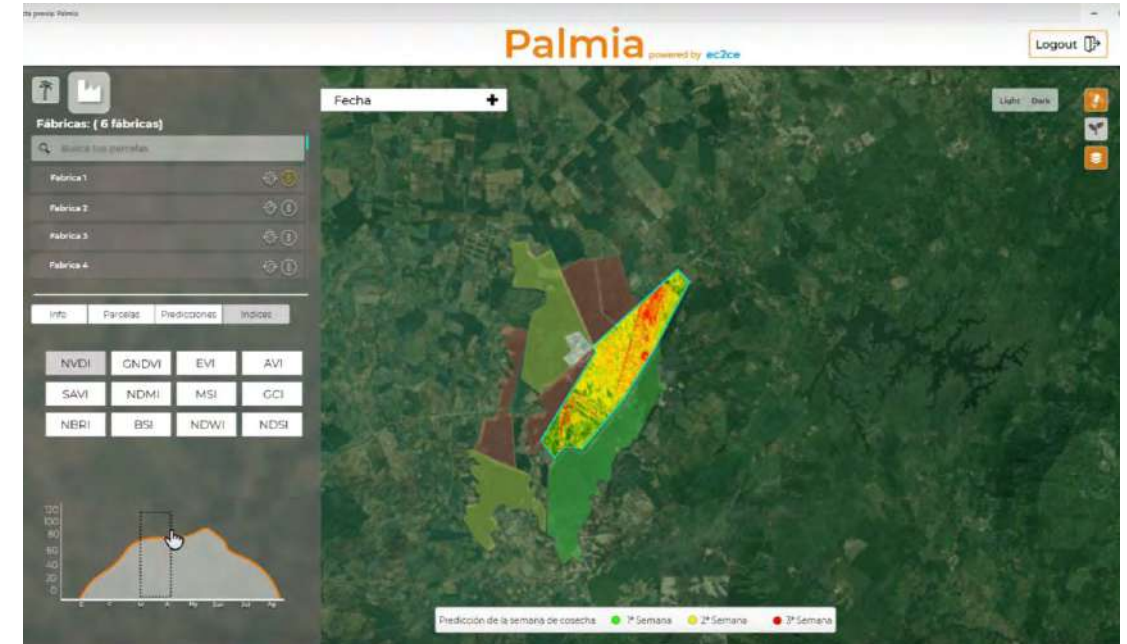
- ERA5 weather data and forecast from European Centre for Medium-Range Weather Forecasts (ECMWF)
- Wind, Temperature, Humidity, Rainfall, Radiation
- Anomalies calculated
- El Niño Southern Oscillation (ENSO)

- Spectral indices from Sentinel and Landsat satellites
- GNDVI, NDMI, NDWI, AVI, SAVI, MCI, GSI, ...

Target: yield improvement

Applying Artificial Intelligence solutions customized to Malaysian palm oil small producers, by:

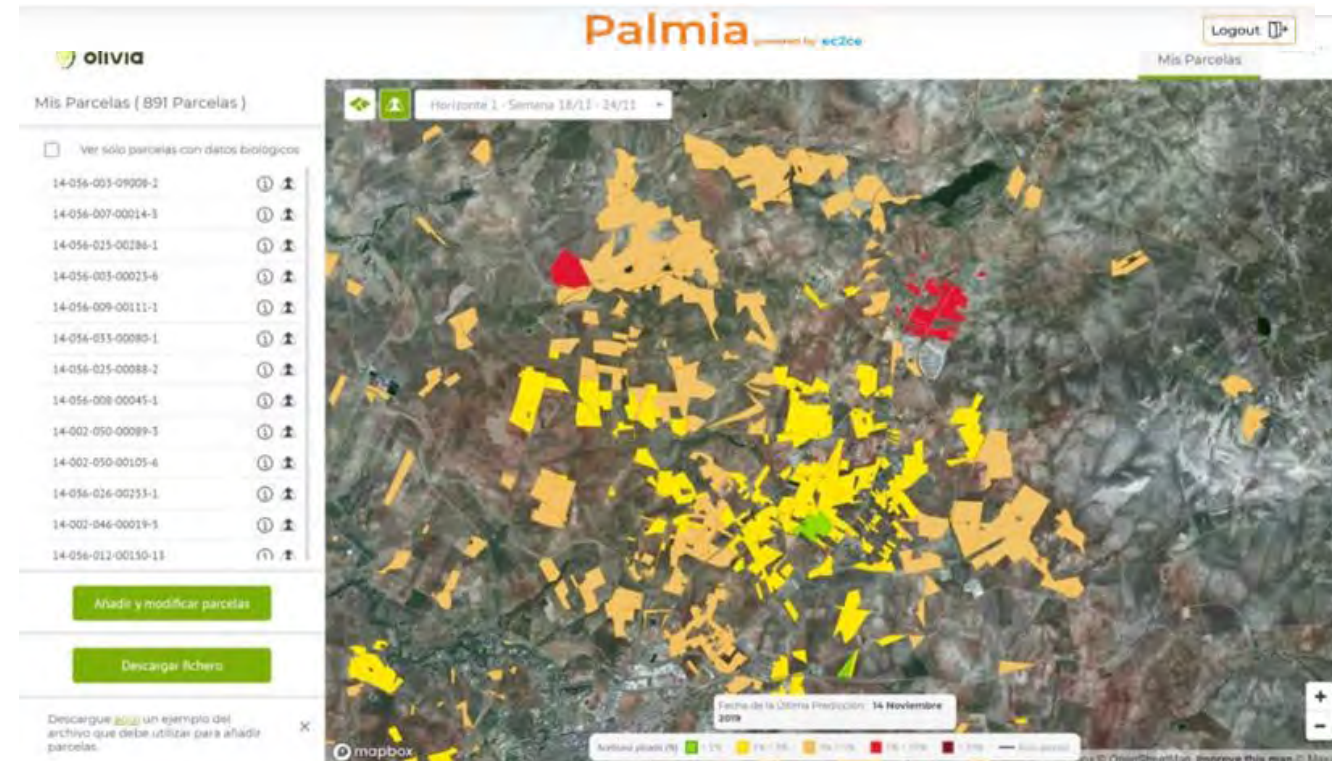
- Using local data (yield, farm data) and public data bases (weather, geospatial, satellite indexes)
- Predictive and optimization modelling by ec2ce to forecast yield at farm level and generate knowledge and best-practices recommendations based on data analytics and predictive analytics
- Optimum fertilization to achieve maximum yield according to external conditions and historical records
- Boost oil potential per field
- Extension of best performance conditions to other growers to facilitate the general yield improvement



Target: predictive pest & disease management

A complete Crop Protection solution:

- Using local data (monitoring data) and public data bases (weather, geospatial, satellite indexes)
- Predictive modelling by ec2ce to forecast pests and diseases risk evolution at farm level based on data analytics and predictive analytics
- Commercially demonstrated (olive, citrus)
- 4 predictive horizons (1-2-3-4 weeks ahead)
- Accuracy over 90% demonstrated
- Risk maps with alerts





We are the Predictive Agriculture

Applying A.I. solutions throughout the agriculture supply chain

Planning & Planting



- Seed performance forecast
- Seed productivity & quality forecast
- Annual curve forecast
- Season weather forecast

In-season



- Yield, and weekly productivity forecast
- Quality forecast (caliber, brix, oil content)
- Predictive Pest & Disease Management
- Optimum fertirrigation to maximize yield
- Planification and forecasting

Harvest & Commercialisation



- Demand forecast
- S&D adjustment
- Labor needs forecast
- Smart harvesting
- Price forecast
 - ✓ FCPO Malaysia
 - ✓ AOVE Spain

Demonstrated capabilities globally



Over 0.5 million hectares modeled to direct customers in Europe and Americas

(including supply & demand global conditions to forecast CPO Price FOB Malaysia)

Some of our customers:



Agriculture Technology (AgTech) Market Map



ANALYZING SATELLITE IMAGES

IN-FIELD MONITORING

ASSESSING CROP/SOIL HEALTH

Descartes Labs, farmshots, Orbital Insight, OmniEarth, HoneyComb, SkySquirrel, DJI, GeoVisual, AGRIEYE, SKYGISKN, AIRWOOD, SENSEI RIV, TRACE, indigo, peat, BENSON HILL, LALAPPA, HIVE, GAMAYA, VRESON, PRECISION RISK

PREDICTIVE ANALYTICS

AGRICULTURAL ROBOTS

CRINSIGHTS, edze, aWhere, OPTIMAL, CLEARPATH, FarmBot, HARVEST CROO, BLUE RIVER, abundant

