

Early Drought and Disease Detection in Eucalyptus Clones at Scale

Case Study

Challenge

Planted Eucalyptus forests are increasingly threatened by changing climate. There is a need for an early warning system capable of monitoring large forest areas.

Solution and Results

Radar and optical imagery was successfully used to track leaf loss patterns across different Eucalyptus clones.

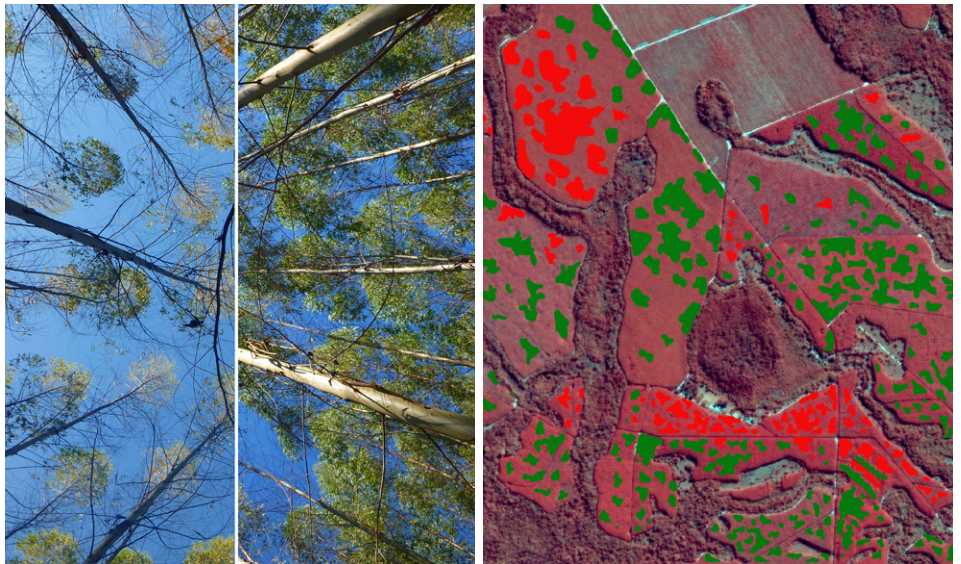
Benefits

PlanetWatchers' analytics platform offers a large scale, all-weather tool to improve the health of planted forests, contributing to climate change mitigation and maximising forest productivity.

“ Climate change and globalisation increase the vulnerability of planted forests to different forest health conditions. ”

Science, Volume 349, 2015

Far right: Change analysis of Eucalyptus plantation in Brazil. Areas of growth are marked with green, areas of leaf loss with red.



Challenge

Commercial Eucalyptus plantations cover more than 20 million hectares globally. According to recent studies, they have become increasingly threatened by climate change and globalisation. Climate change increases air temperature and reshapes rainfall regimes, increasing the vulnerability of forests to drought, pest and fungal diseases.

The main symptom of drought, pest and fungal diseases is the loss of leaves from the canopy. Different Eucalyptus clones exhibit high variability in resistance to these threats. An early warning system for forest damage would allow forest managers to act quickly to address health problems and reduce the loss of productive trees and stands.

The client is a leading pulp and paper producer with large and distributed forest assets in Brazil. They needed a cost-effective, high-frequency early warning system for forest damage. However, variable weather conditions common in Brazil and

elsewhere require a combined optical and radar-based solution for monitoring purposes.

Solution and Results

The PlanetWatchers analytics platform combines optical and radar imagery from SPOT and TerraSAR-X to detect changes in forest structure and biomass. Radar imagery delivers reliable information regardless of cloud cover or fog.

The TerraSAR-X radar imagery is extremely sensitive to leaf loss in the canopy, a major symptom of various forest health conditions. 2017 SPOT imagery allowed differentiating areas of multiple Eucalyptus clones and was used as a calibration for the radar data.

The analysis revealed forest areas of normal growth and areas suffering from decreased leaf area, allowing the identification of Eucalyptus clones that show resilience to drought and subsequent diseases.

Applicability

The PlanetWatchers' analysis can be applied to different types of forests across the globe to increase wood production and to protect natural forests.

Other areas of application include agriculture, energy production, mining and beyond.

Organisation Involved

Founded by experts in big data, remote sensing, and cloud computing, PlanetWatchers is a VC-funded startup dedicated to empowering natural resource intensive enterprises with actionable data to optimise their businesses. PlanetWatchers has offices in San Francisco and Tel Aviv.



Benefits

PlanetWatchers' analysis of radar and optical imagery gives operations teams intelligence of the identifying factors related to drought and disease over large areas of Eucalyptus plantations. This allows early intervention to control different forest health conditions. In the last few years, the annual loss due to drought impacted over 1.5 million hectares resulting in over \$150 million of annual

losses. PlanetWatchers' early detection of these areas enables clients to take preventive measures and reduce the yield loss by up to 40%.

- All-weather analysis
- Sensitive to various forest health conditions causing leaf loss
- Enables early intervention to control forest diseases

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