Re-Forest-ER

The integrated (agro)forestry monitoring, conservation & management platform
Willie Smits

“Preserving nature through the empowerment of local people”

“Nature based forest rehabilitation for renewable biomass energy”
Re-Forest-ER

There is still time and there are still opportunities to clear up the mess man has created.

Latest technologies enable unprecedented insights and transparency as basis for cooperation and trust between caring parties.
Our world is in peril

Deforestation is contributing to several tipping points that will impact our world in many irreversible ways:

- Loss of biodiversity will rob us from new medicines and valuable genes
- Regional deforestation will cause more droughts, fires and sea level rise
- Deforestation will cause accelerated extinction of flora and fauna, flooding, erosion, land slides, dead zones, navigational issues, food security, reduced precipitation, etc.
- Deforestation will contribute to more pandemics and poverty
Agroforestry can provide many solutions...

Soil Protection ✓
Nutrient Recycling ✓
Good Light Capture ✓
Climate Regulation ✓
Food, Water, Energy ✓
Jobs and Income ✓
Materials, Medicines ✓

An actual Agroforest System from Java
The Problem

how to scale and manage it

Monitoring and coordinating many such complex and small-scale integrated units needs new approaches and latest technologies.
There are many different agroforestry systems, and they can involve hundreds of different plant species.
Solution

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- developing a web platform
- supporting applications which help to map and track sustainable conservation work
- providing new insights for better decision making and rapid actions
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Novel Sensors

Cloud-based Geoinformation

AI-based algorithms

Local-based knowledge and leadership
Area Of Interest

Mixed tropical forest, in East Kalimantan, Indonesia.
**Applications**

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Web Platform

Re-Forest-ER at Geospatial world forum
Benefits

The platform and applications will result in various benefits for all stakeholders involved in mixed, tropical agroforestry such as:

- Monitor and track operations
- Observe potential threats and opportunities
- Quantify impact and natural resources
- Rapid, data-driven planning and action
- Forecasting capabilities
- Provide transparency
- Increase operational efficiency
- Enable and empower local capacity building
- Scale and replicate your work into new areas and environments
Application Example: Illegal Logging

Re-Forester-ER’s *illegal logging* detection application utilises

- Trend detection from historical imagery
- the latest change detection algorithms
- novel radar satellites
- continuous improvement from field feedback

To provide **near-real time insights** about suspicious activities which allows for more efficient involvement of law enforcement.
Application Example: **Biomass monitoring**

*Biomass monitoring* and quantification is essential for optimal work planning as well as the validation of carbon credits.

Our method combines:

- satellite earth observation
- drone imagery from multiple sensors
- Long term biomass monitoring plots
- sophisticated tree species modelling
Application Example: Fire Monitoring

- From historical information, online climate data and LIDAR data do **fire risk mapping**
- Advances current **fire monitoring systems**
- Provides **near-real time insights** directly to field workers and fire brigades
- Combining infrastructure data about road condition & water reservoirs in combination with thermal drone imagery to plan actions
- Rapid action and rescue.
Application Example: Drone Lidar

LiDAR (Light Detection and Ranging) instruments mounted on drones allow:

- unprecedented level of analysis
- unlock new application possibilities such as:
  - biomass estimation
  - tree species recognition
  - tree growth models
  - terrestrial elevation models for reduced impact harvesting planning
The LIDAR data analyses allow us to produce a detailed tree position map and see the old (compacted) skid roads underneath the tree canopy. This way we can optimize the harvest planning while reducing damage and optimize land use planning.
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Vision

Combine sustainable agroforestry practises with above-average return of investment to disrupt destructive economic and environmental paradigms and ensure lasting benefits for the environment, local communities, wildlife and financiers alike.
The Team

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Jessica Immelman
Laith Ojjeh
Thank you