Twitter: @UsenseUAV
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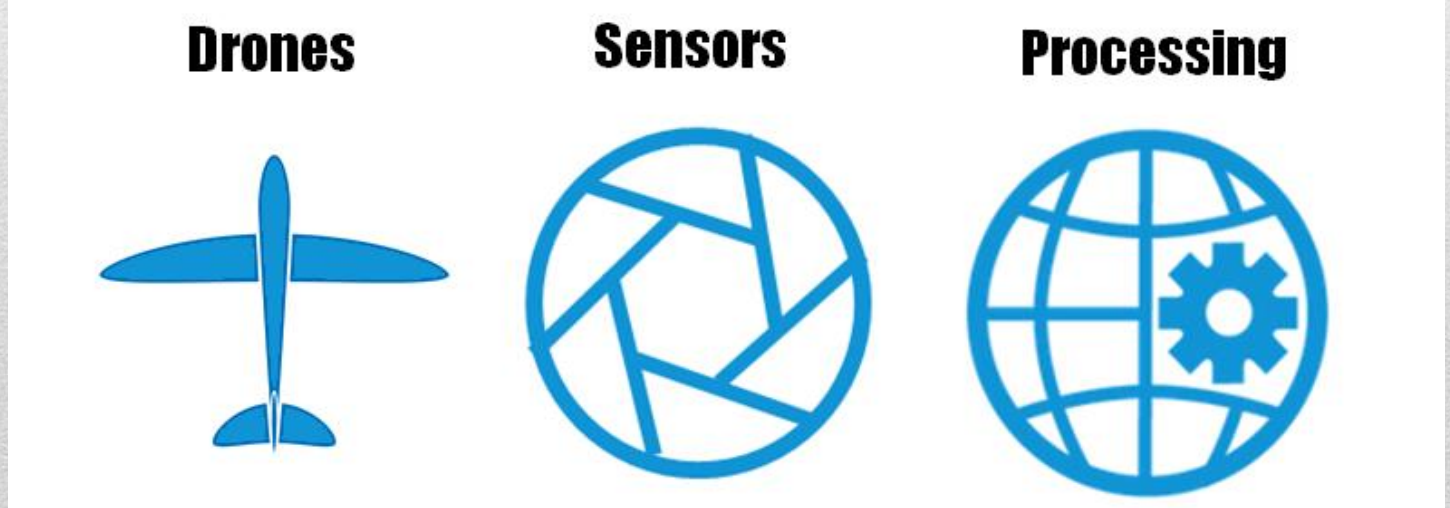
Agro-ecosystems mapping by low cost photogrammetry, based on UAVs

Dries Raymaekers – Usense UAV

What we do

USENSE captures **aerial data** from innovative **drone** platforms **to support decision makers** on optimizing their resources and improving performances**. Open-source hardware and software** with a unique fleet of **drones**, **sensors** and **processing algorithms** ensure cost-efficient and flexible **solutions** for broad range of applications.



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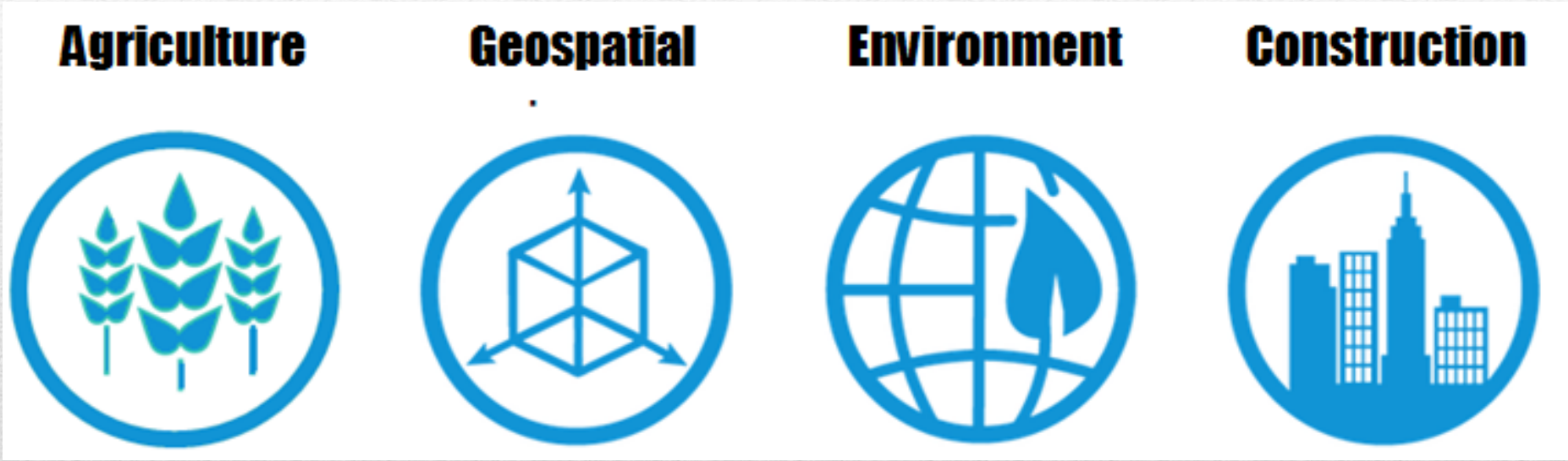
Markets



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Remote Sensing: looking through the clouds or fly below?

Belgium in October: Annimated GIF of MODIS satellite imagery
Source: https://earthdata.nasa.gov/labs/worldview/

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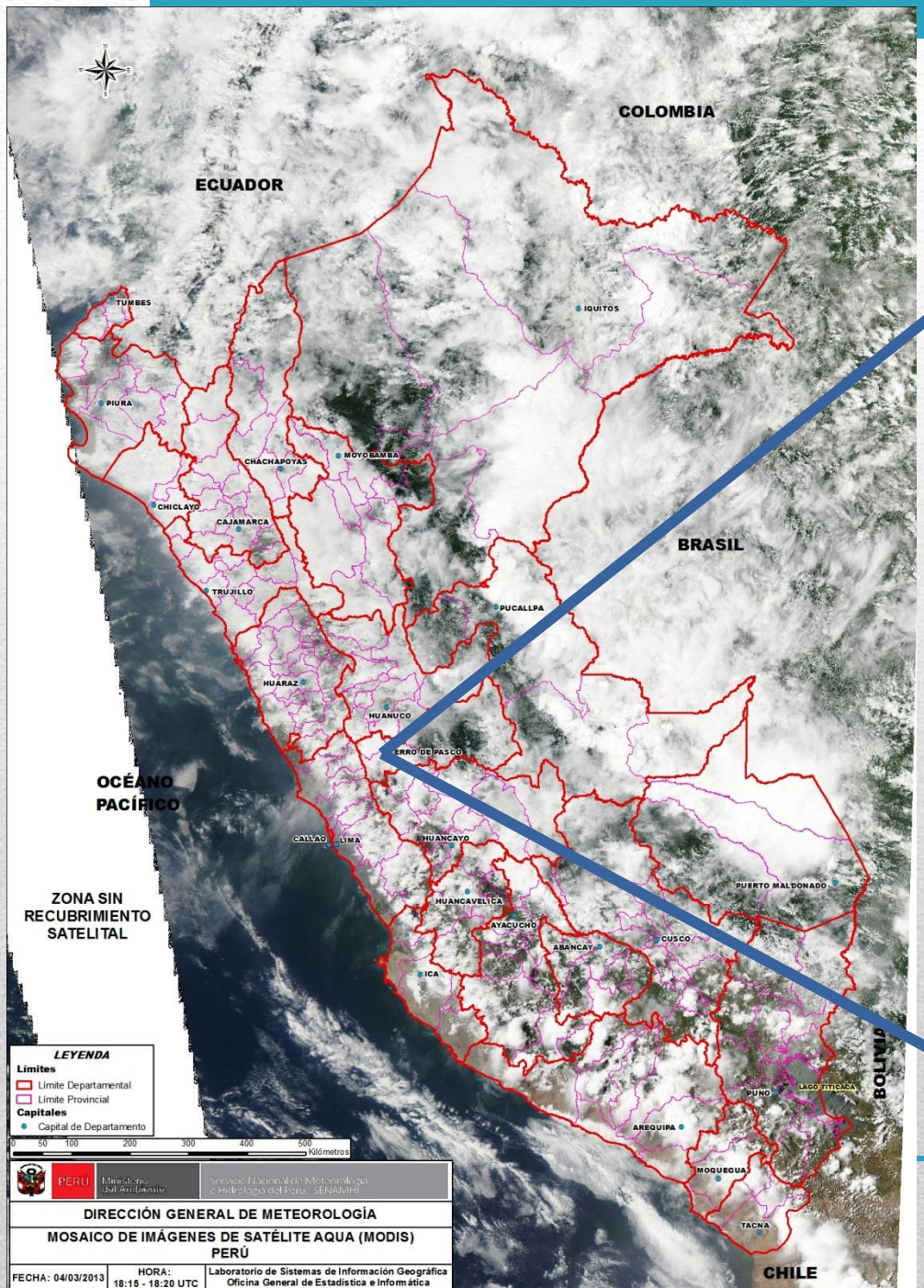
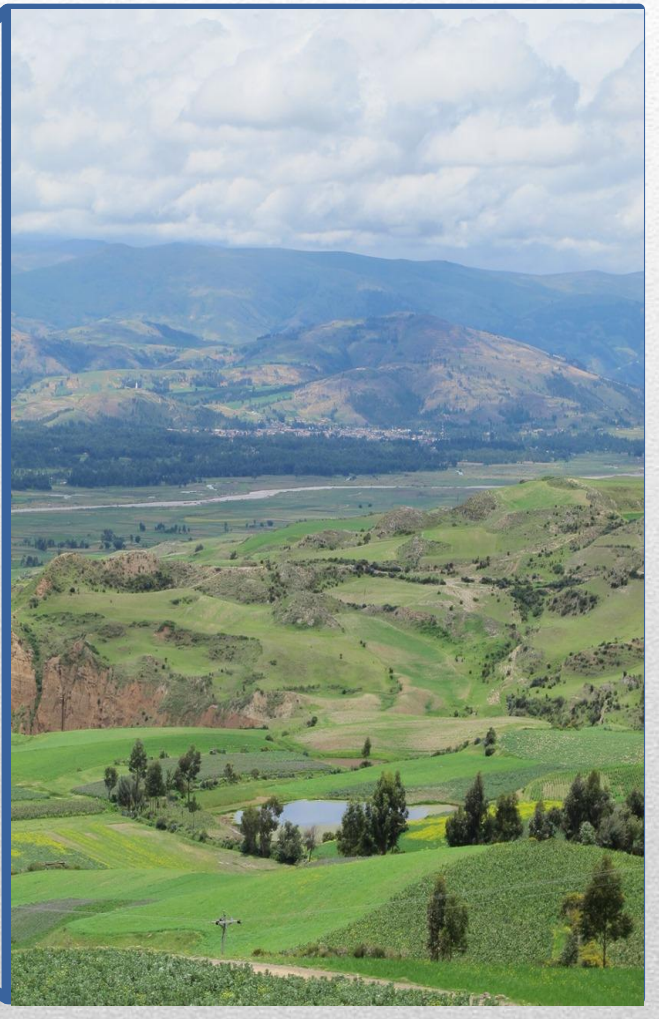
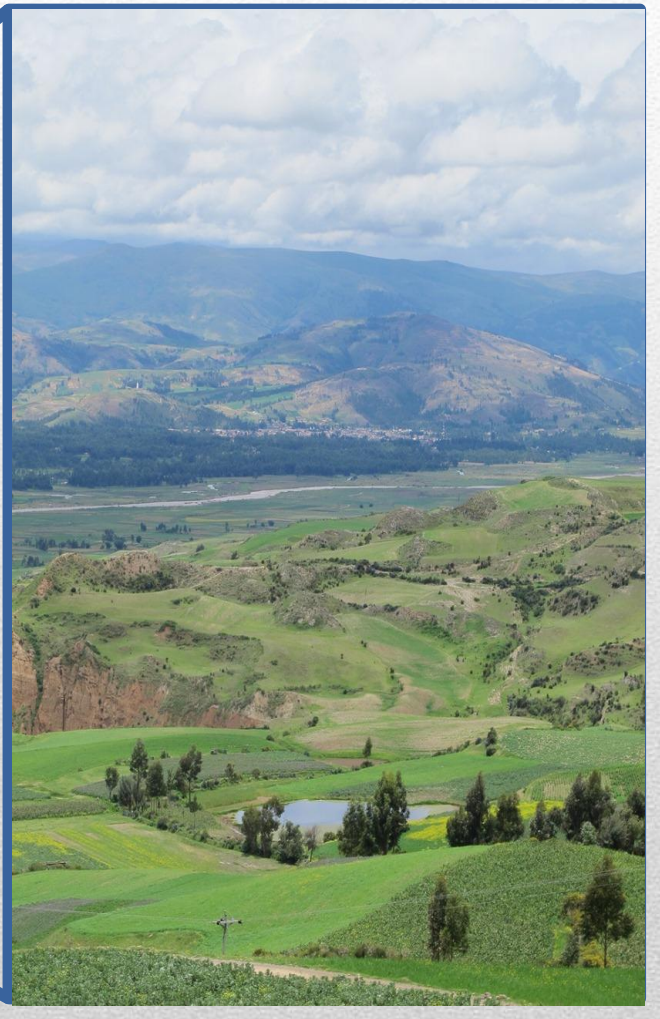
MODIS image of Peru 4/03/2013





Orthomosaic of UAV images 4/03/2013



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USENSE-X8 UAV

- All you need to start mapping in one box
- 2.1m wingspan designed for stable flights
- 3kg take-off weight
- 30-40min operational time
- $2km^2$ - 200m AGL - 75% overlap
- 3cm resolution imagery
- Telemetry- range up to 10km
- Room and technology to upgrade..

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Technology - Drones

USENSE-MD8

USENSE-Jet

USENSE-X8

Use	Inspection	Mapping	Mapping XXL
Operational time	15min	30min	30-60min
Area in one flight	10 ha	100ha	+200ha
Weight	2.7kg	2kg	3-4kg
Camera	RGB, NIR, Multispectral Thermal	RGB, NIR	RGB, NIR, Multispectral Hyperspectral,Thermal
Autopilot	Auto take-off/landing Waypoint navigation	Auto take-off/landing Waypoint navigation	Auto take-off Assisted Landing Waypoint navigation
Software	Planning & Monitoring	Planning & Monitoring	Planning & Monitoring

Technology - Sensors

USENSE selects the **right sensor** for each specific application. Farmers can identify **plant health stress** far beyond human vision with **multi- or hyperspectral** sensors , Inspection teams of **solar cells** can be detected hotspots with a **thermal** imaging sensor and geospatial **surveyors** can rely on **+24MP** camera systems

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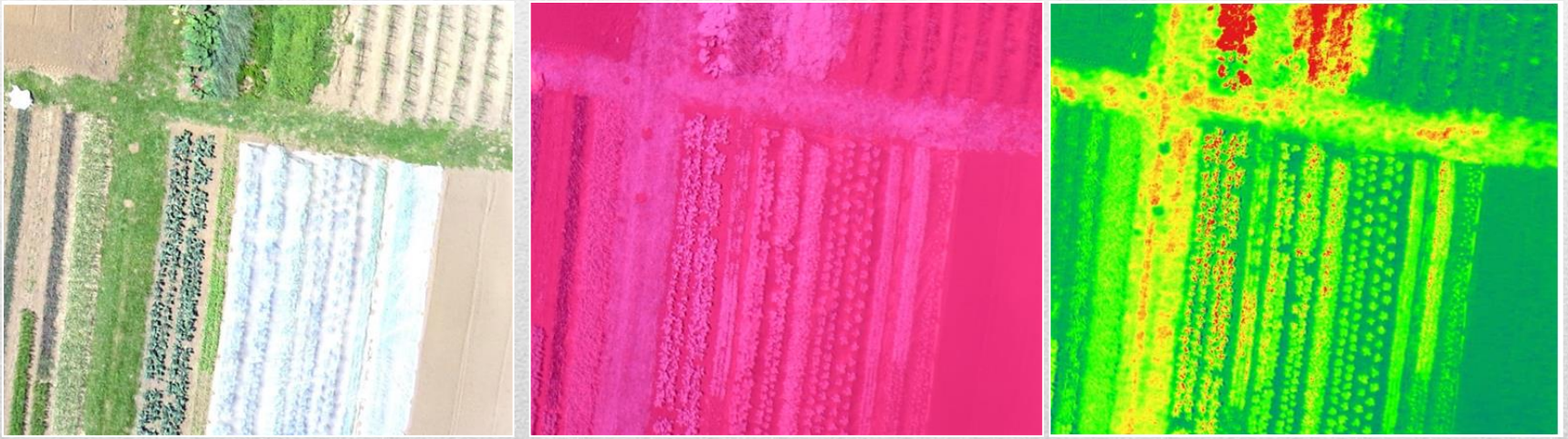
Technology - Sensors

Improved vegetation/crop monitoring with Near Infrared

RGB **Near Infrared** **NDVI**



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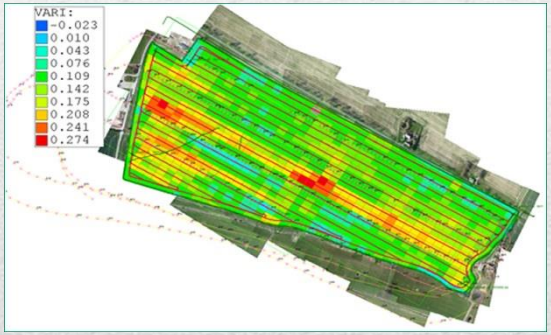
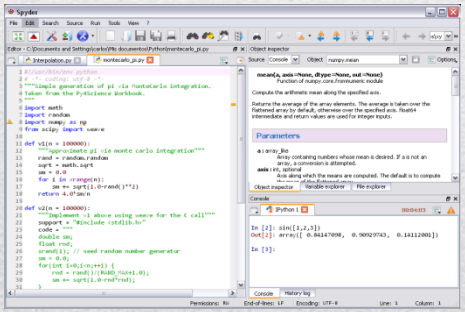
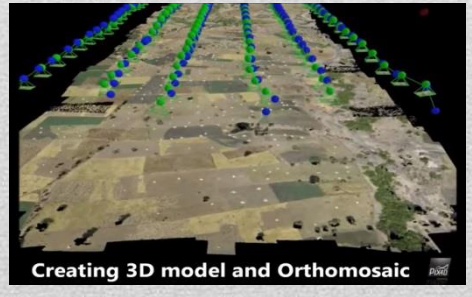
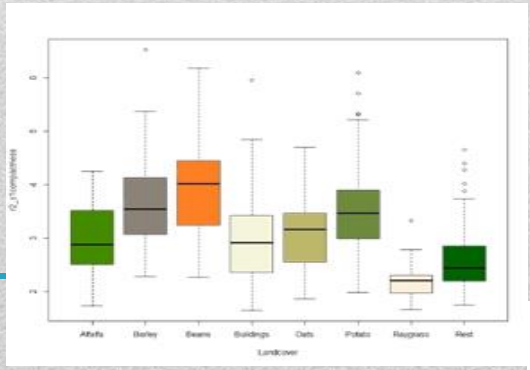
Technology – Image processing

USENSE doesn't just fly drones, nor only supplies a set of images. We use **image processing and analysis tools**, which are adopted from the GIS and Remote Sensing community to deliver a **wide range of geospatial products** aimed to drive our **customer productivity**.









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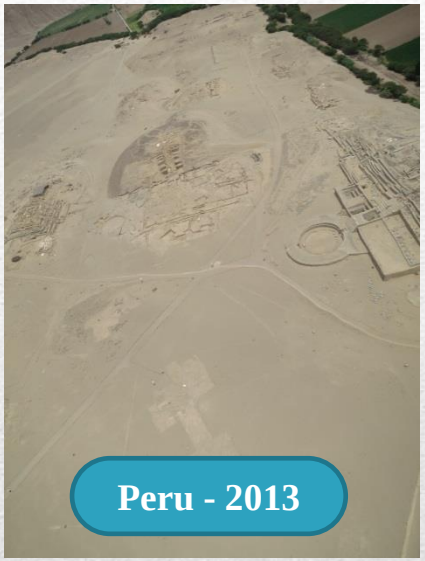
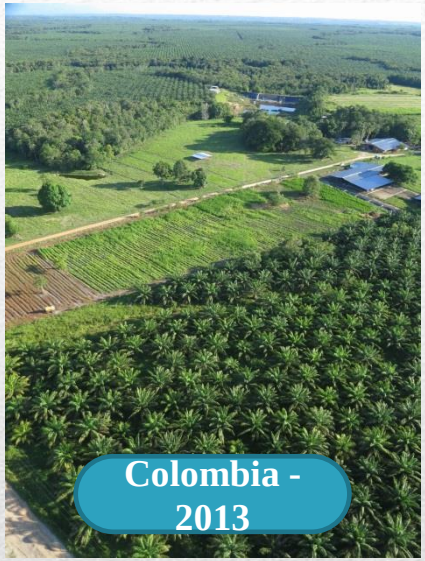
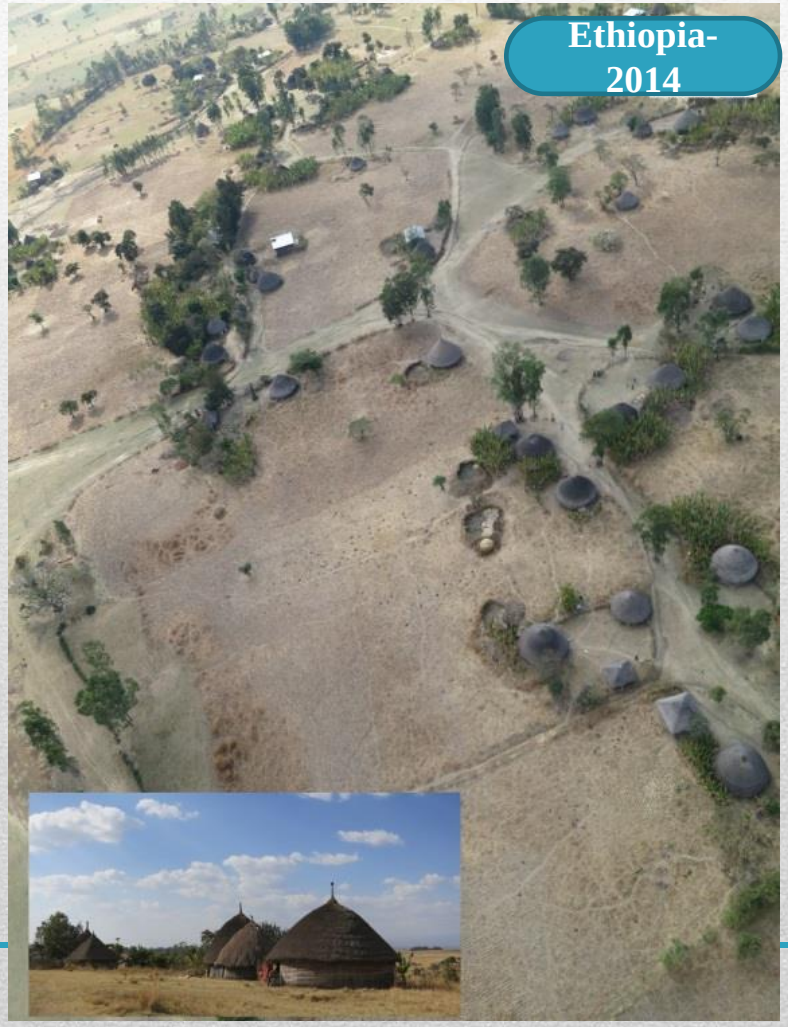
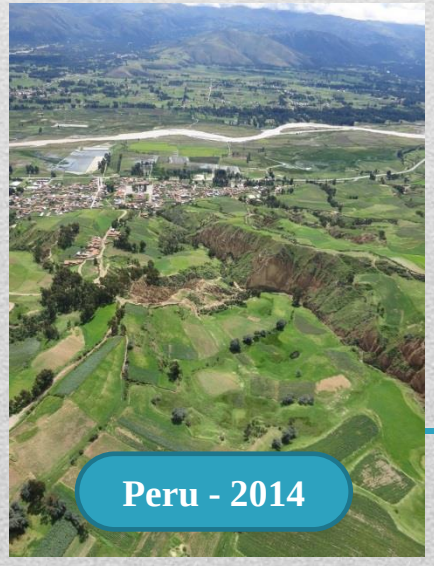
RECENT PROJECTS - Mapping









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RECENT PROJECTS – Training


Peru - 2014


Colombia - 2013


Ecuador - 2014


Peru - 2014


Cuba - 2014


Peru - 2013


Ethiopia- 2014

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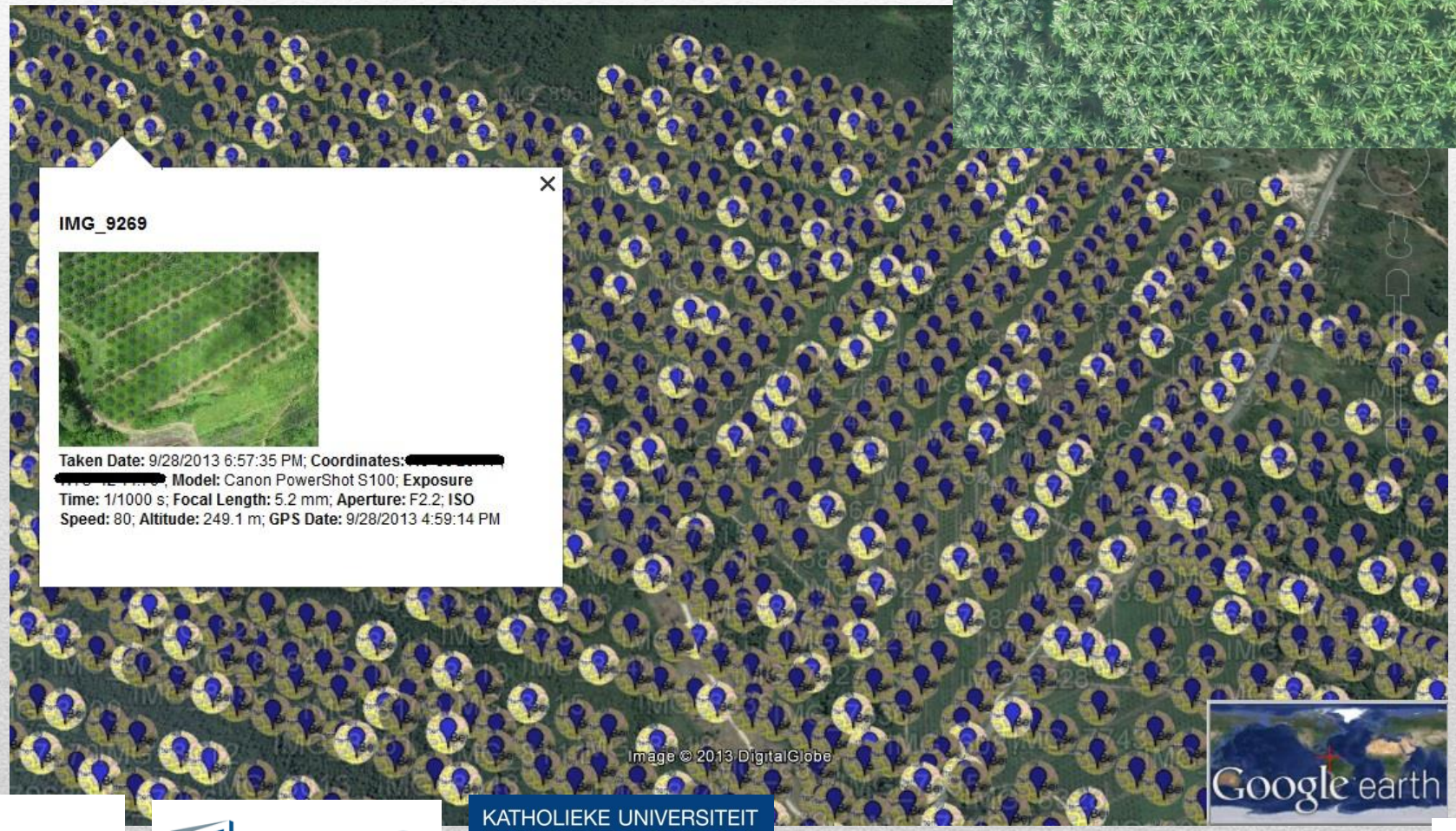
Sugercane - Cuba

Oil Palm - Colombia



fedepalma

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Oil palm - Colombia

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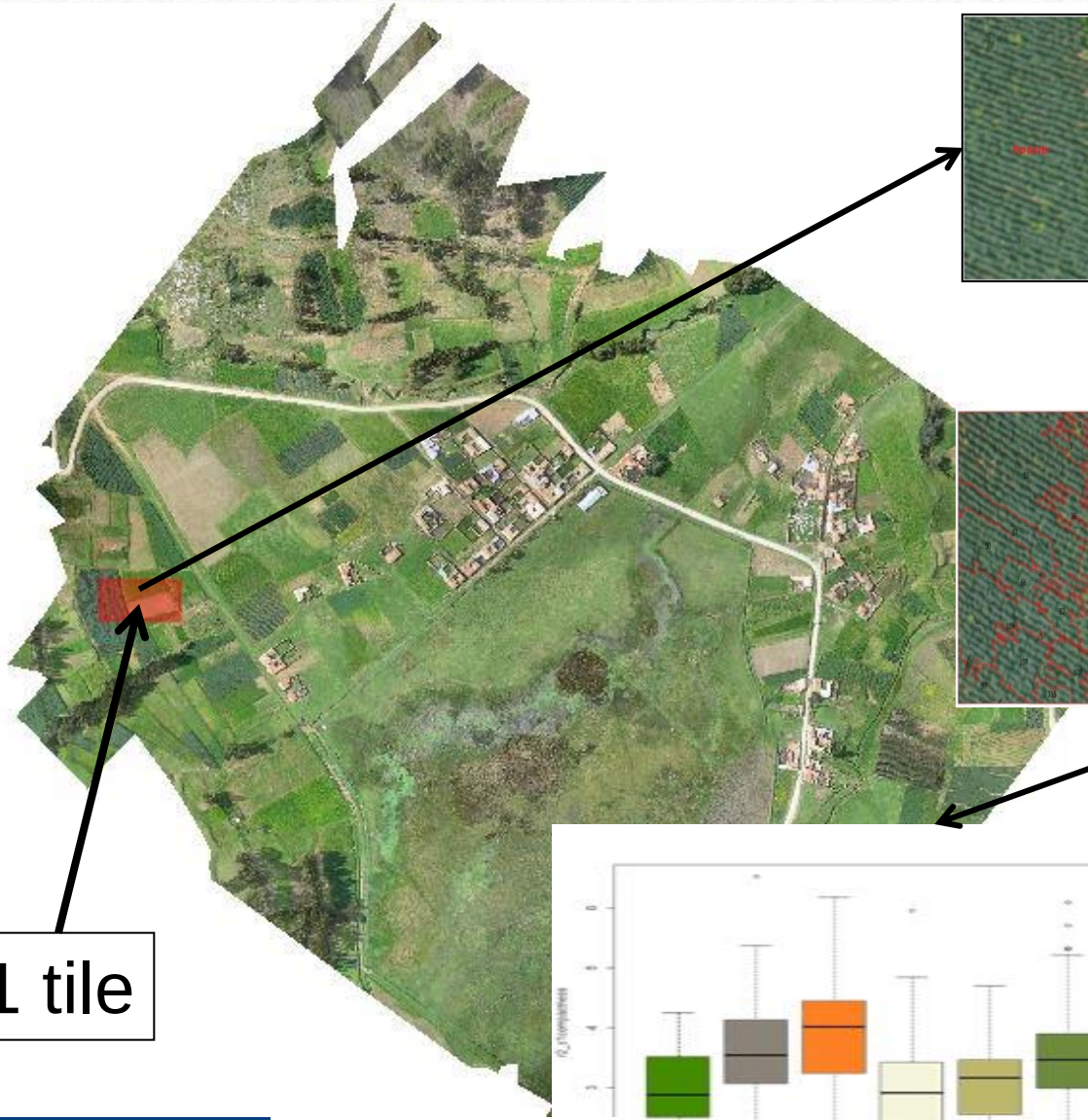
Landuse evaluation - Peru

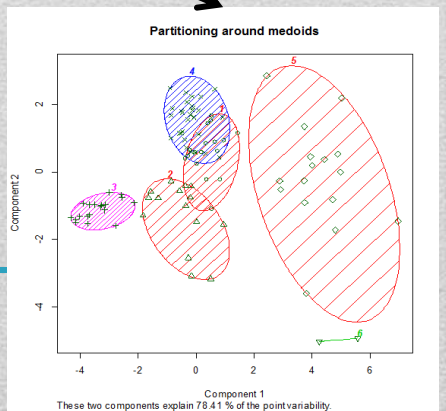


1 tile

Superpixel algorithm

Supervised

Unsupervised



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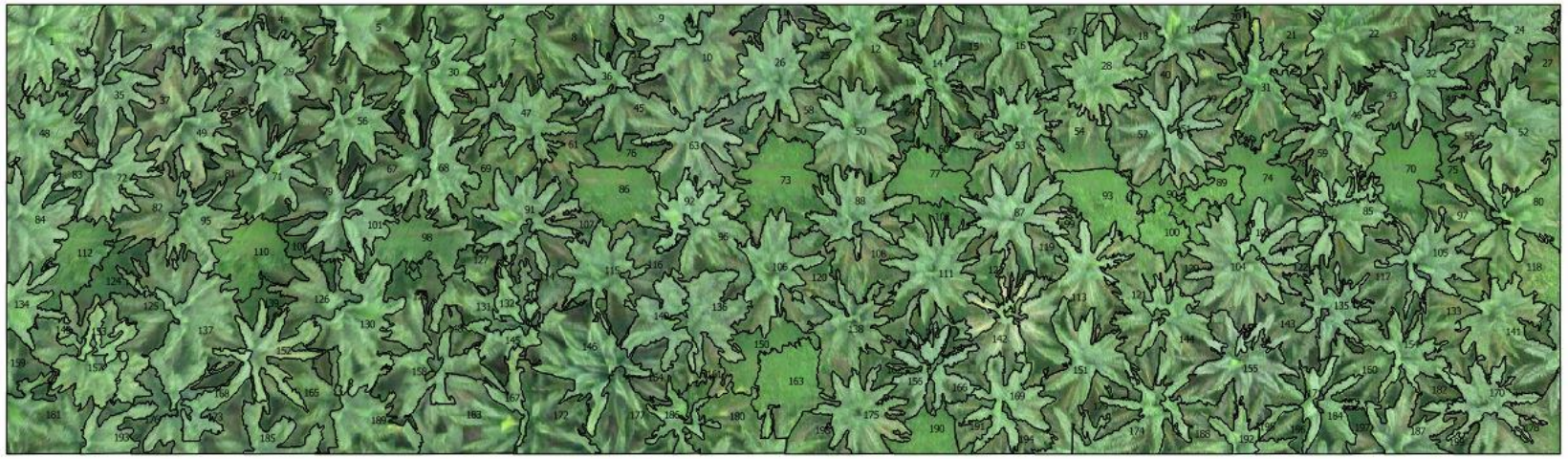
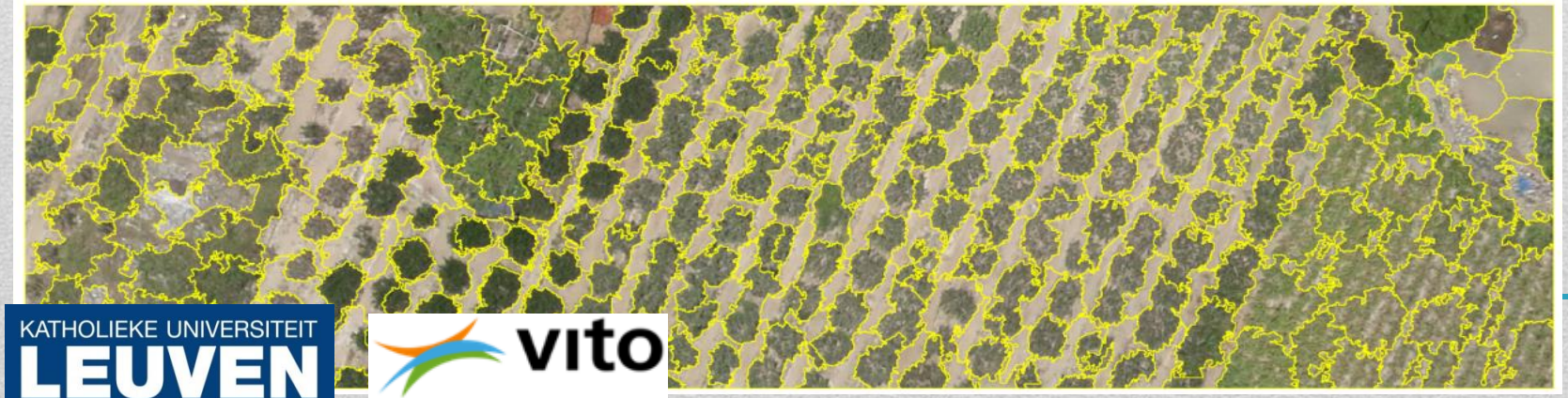
Landuse evaluation

Results Superpixel algorihtm

Oil palm



Apple trees



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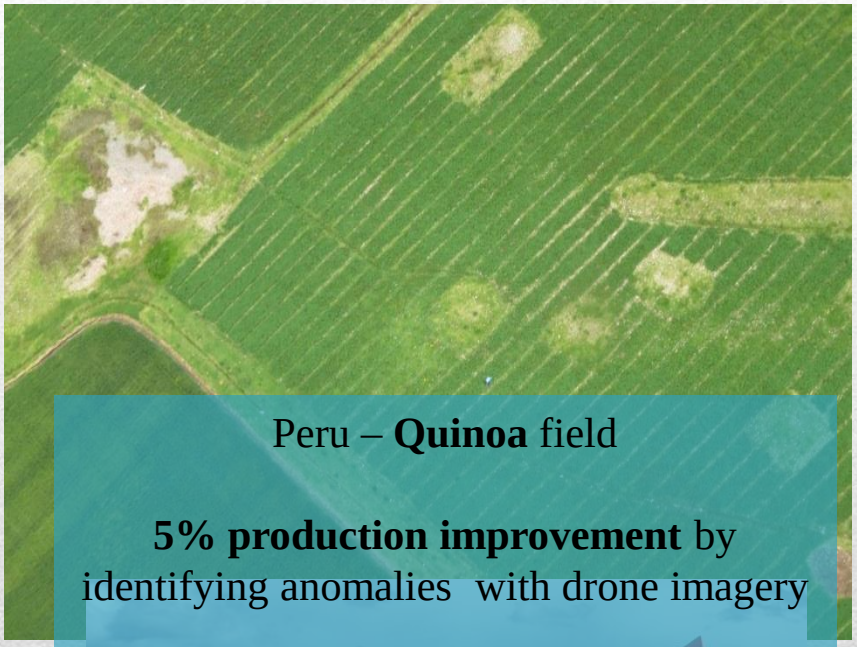
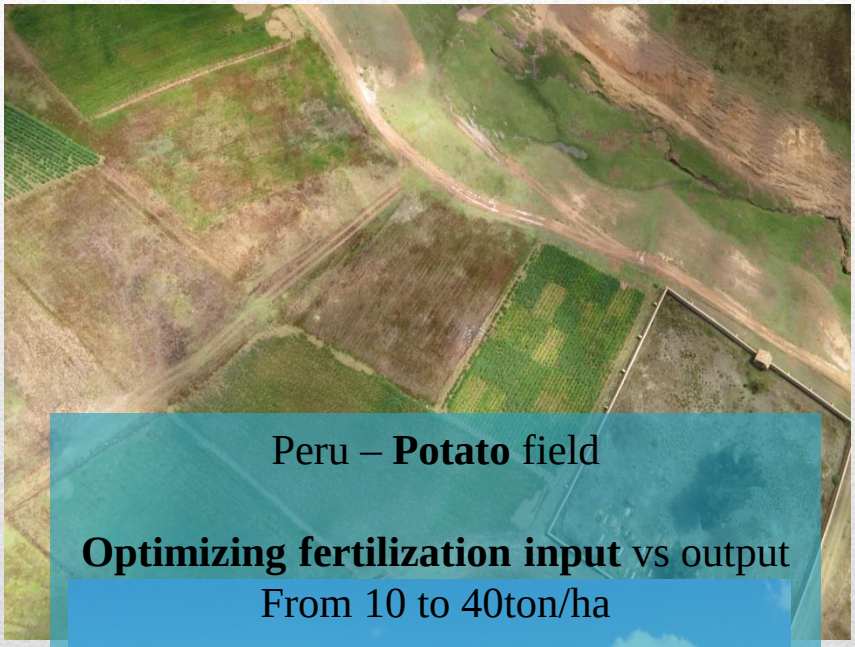
Production optimization



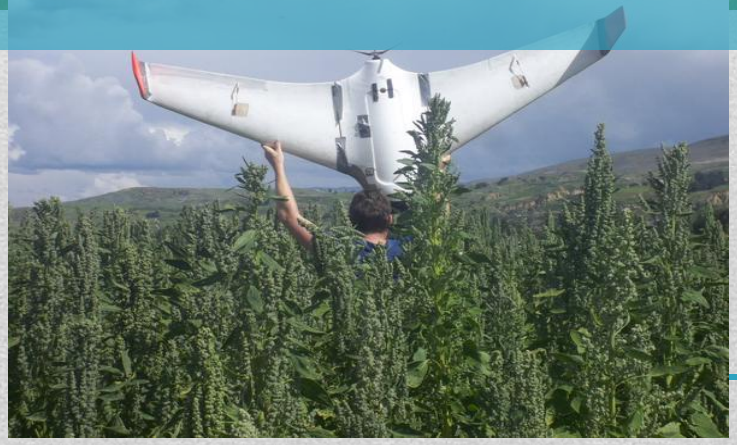
Peru – **Quinoa** field

5% production improvement by identifying anomalies with drone imagery



Peru – **Potato** field

Optimizing fertilization input vs output
From 10 to 40ton/ha



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Let's map your world!

Are drones the game changers we all have been waiting for?

*YES.. But it will only be **together** with recurring satellite information, fast processing capacity, smart algorithms and enthusiastic people that it can have a real impact on food production!!*

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