



SATELLIGENCE

Arjen Vrielink / Director
vrielink@satelligence.com

DISCUSSION READY DATA

How state of the art Remote Sensing services contribute to sustainability



"In recent years, the nascent **satellite sector** and related fields like geospatial data analysis have received **hundreds of millions of dollars** in private investment, but profitable exits are still few and far between."

<https://twitter.com/jimmyrocks/status/1139898895499235334>





INGREDIENTS

Prologue

GIS in 1999: DSS

0 to 1: perfectionists are nihilists

GIS in 2019: AI & ARD

Action! towards DRD



GIS IN 1999 DECISION SUPPORT SYSTEMS







Wow! Geodata, now
we can have
decision support
systems





Wow! Geodata, now
we can have
decision support systems



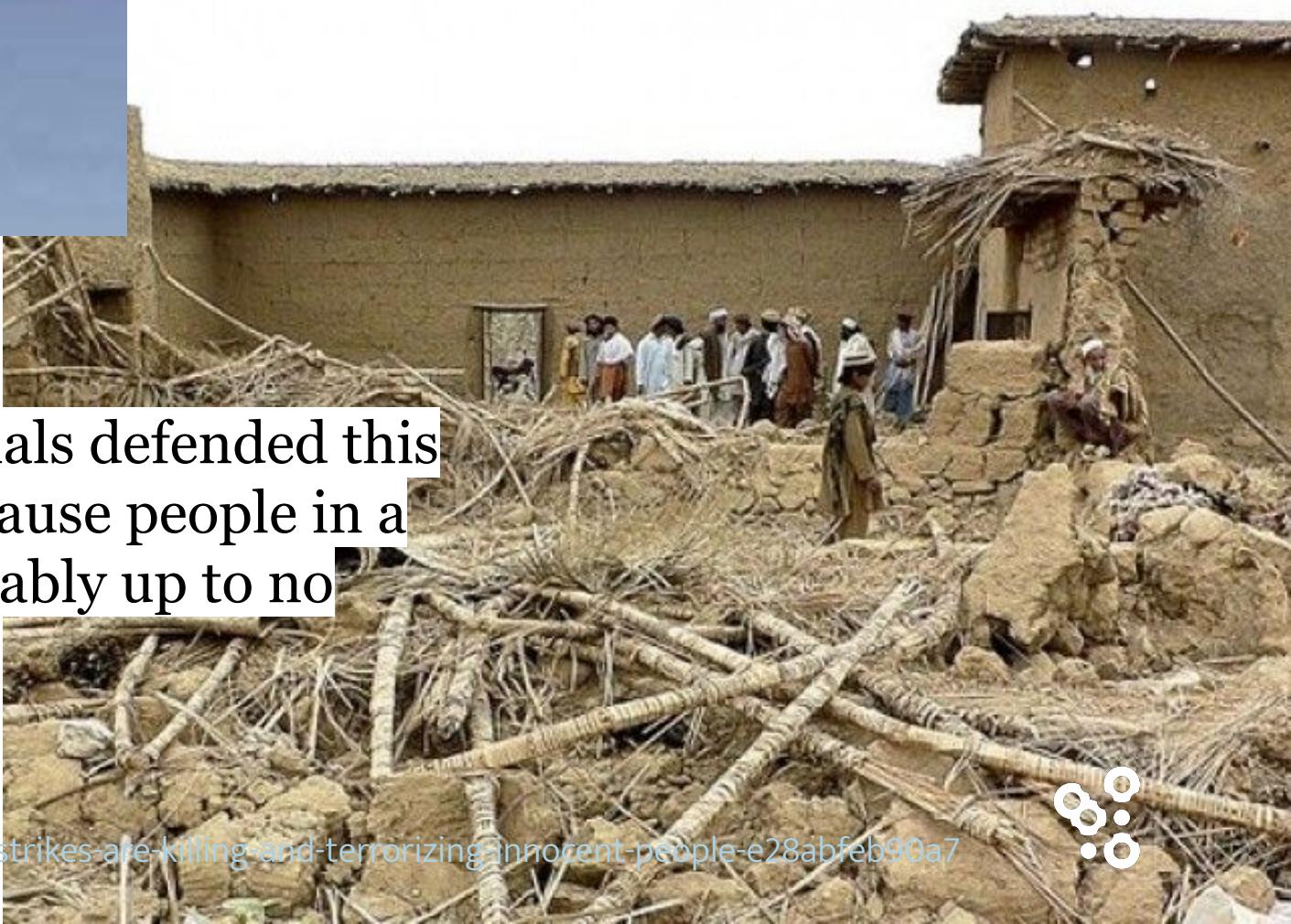
Systems and data shouldn't make decisions; decision making should be done in the **political** domain





President Obama reclassified the definition of “combatant” as “all military-age males in a strike zone.”

Counterterrorism officials defended this as “**simple logic**” because people in a terrorist area are “probably up to no good.”





0 TO 1 PERFECTIONISTS ARE NIHILISTS



0

100



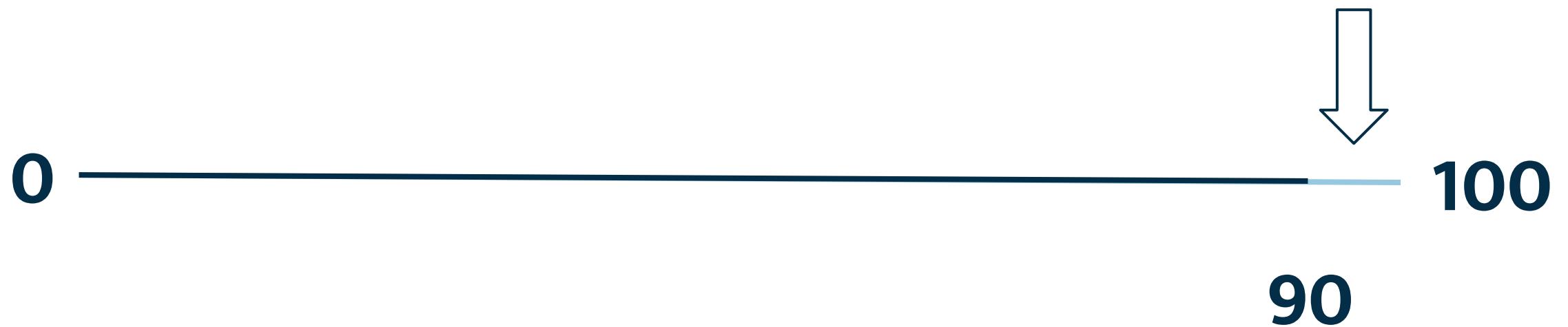
0

100

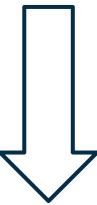




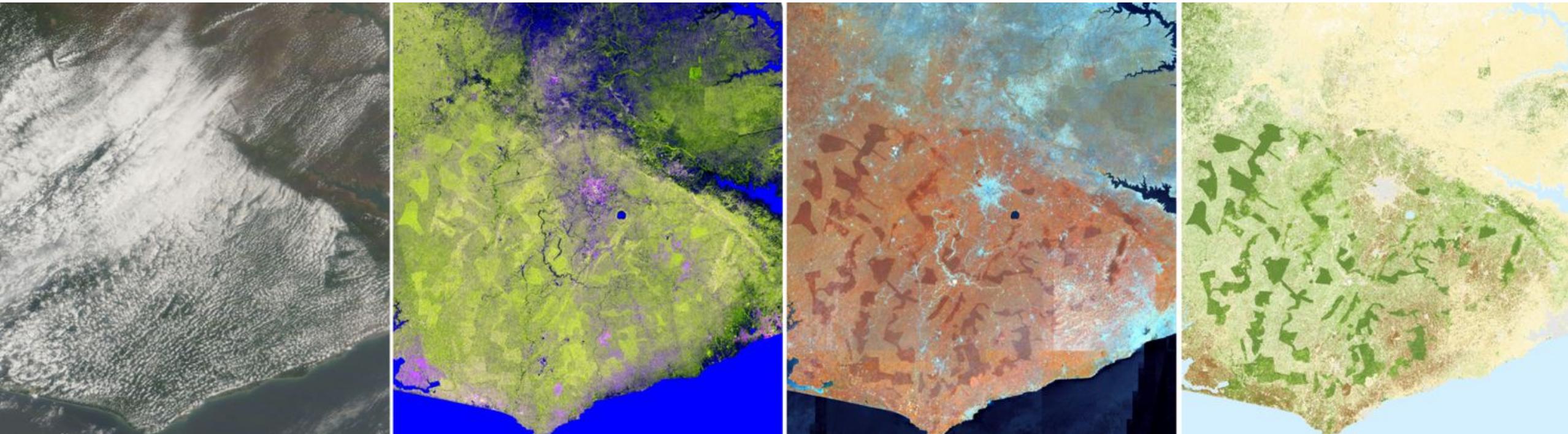
Perfectionist







GHANA 250,000 km²



SIZE INPUT DATA

800 GB

1.5 TB

XGBoost
(Gradient Boosted Trees)
Random Forest

SIZE IN CLASSIFIER

34 GB

160 GB



ITERATIVE BAYESIAN UPDATING + RADAR

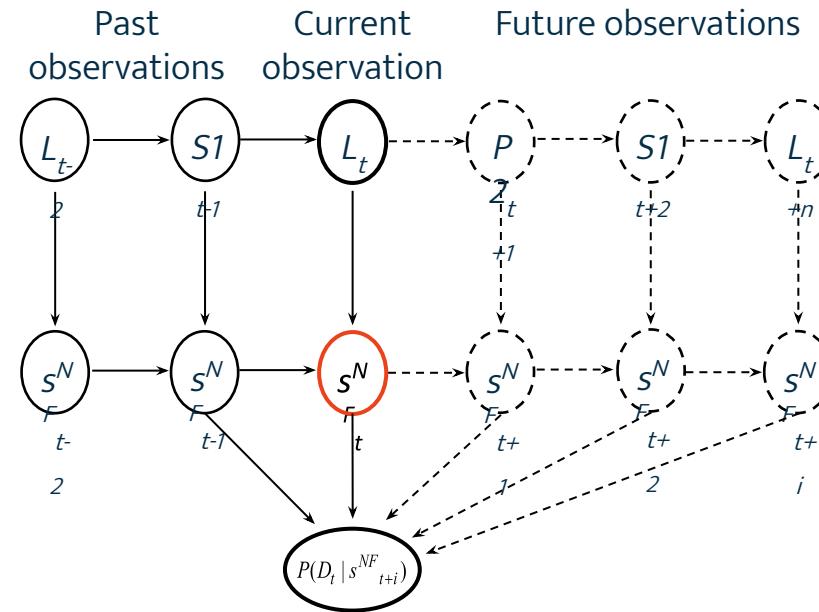


ITERATIVE BAYESIAN UPDATING + RADAR

Say what?







Multi-sensor time series observations

Conditional non-forest probabilities

Conditional probability
of deforestation at t

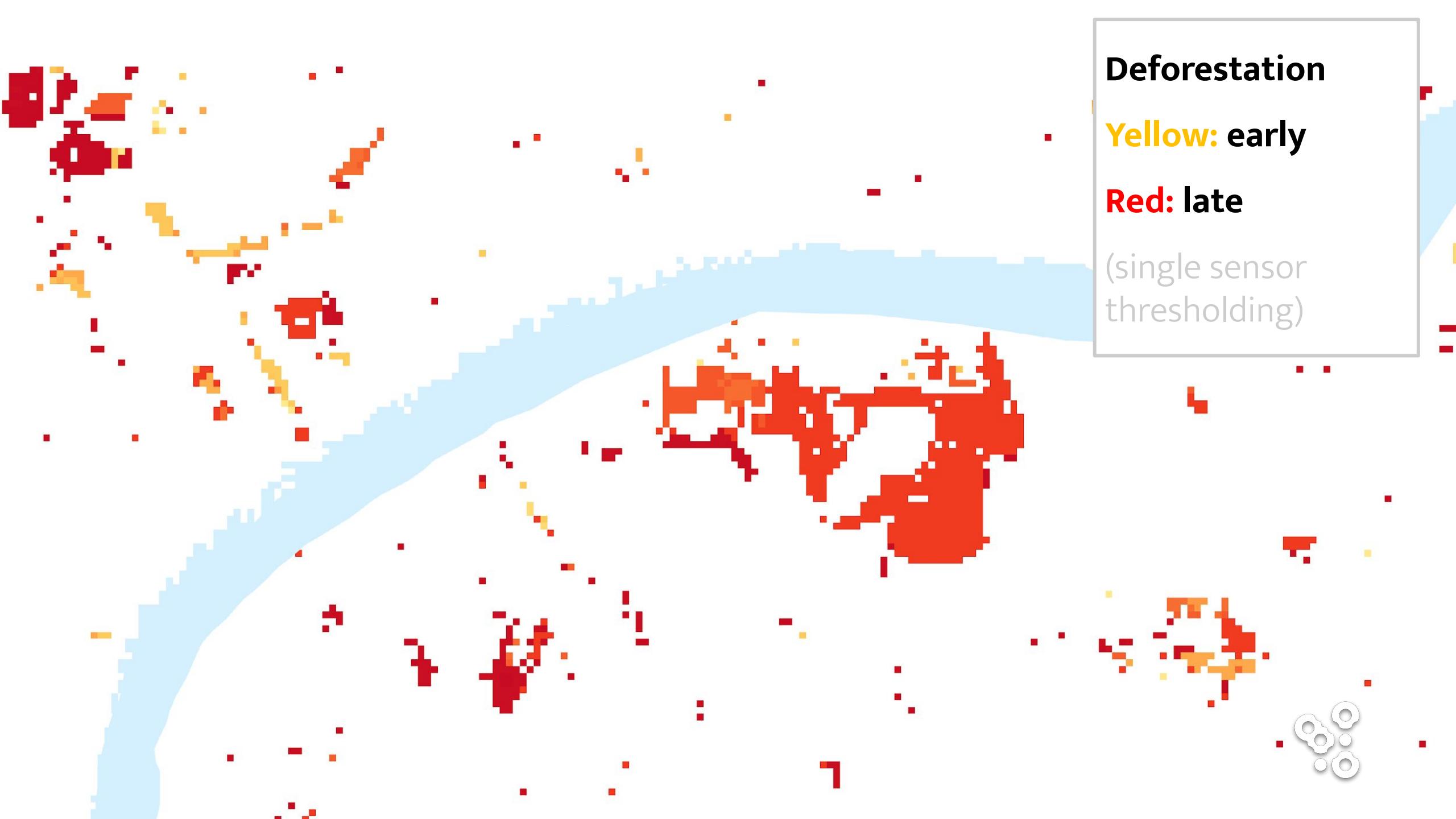
If conditional NF probability (s^{NF}) $> 0.5 \rightarrow$ Flag potential deforestation

→ Calculate conditional probability of deforestation, $P(D_t | s^{NF}_{t+i})$

Bayesian probability updating

$$P(D_t | s^{NF}_{t+i}) = \frac{P(s^{NF}_{t+i} | D)P(D_t | s^{NF}_{t+i-1})}{P(s^{NF}_{t+i})}$$



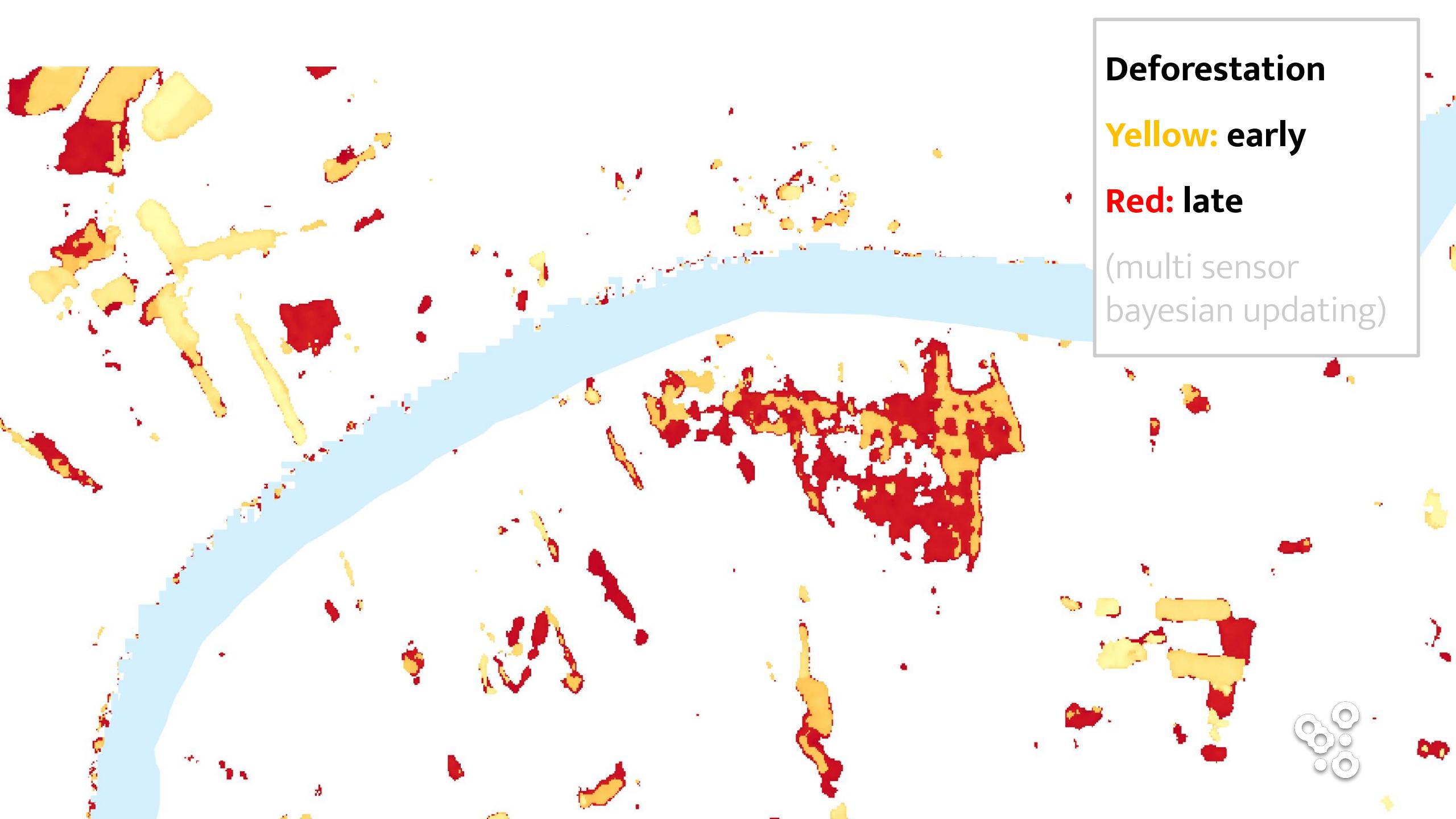


Deforestation

Yellow: early

Red: late

(single sensor
thresholding)



Deforestation

Yellow: early

Red: late

(multi sensor
bayesian updating)

ITERATIVE BAYESIAN UPDATING + RADAR

Great, but like, whatever man



GIS IN 2019: AI & ARD

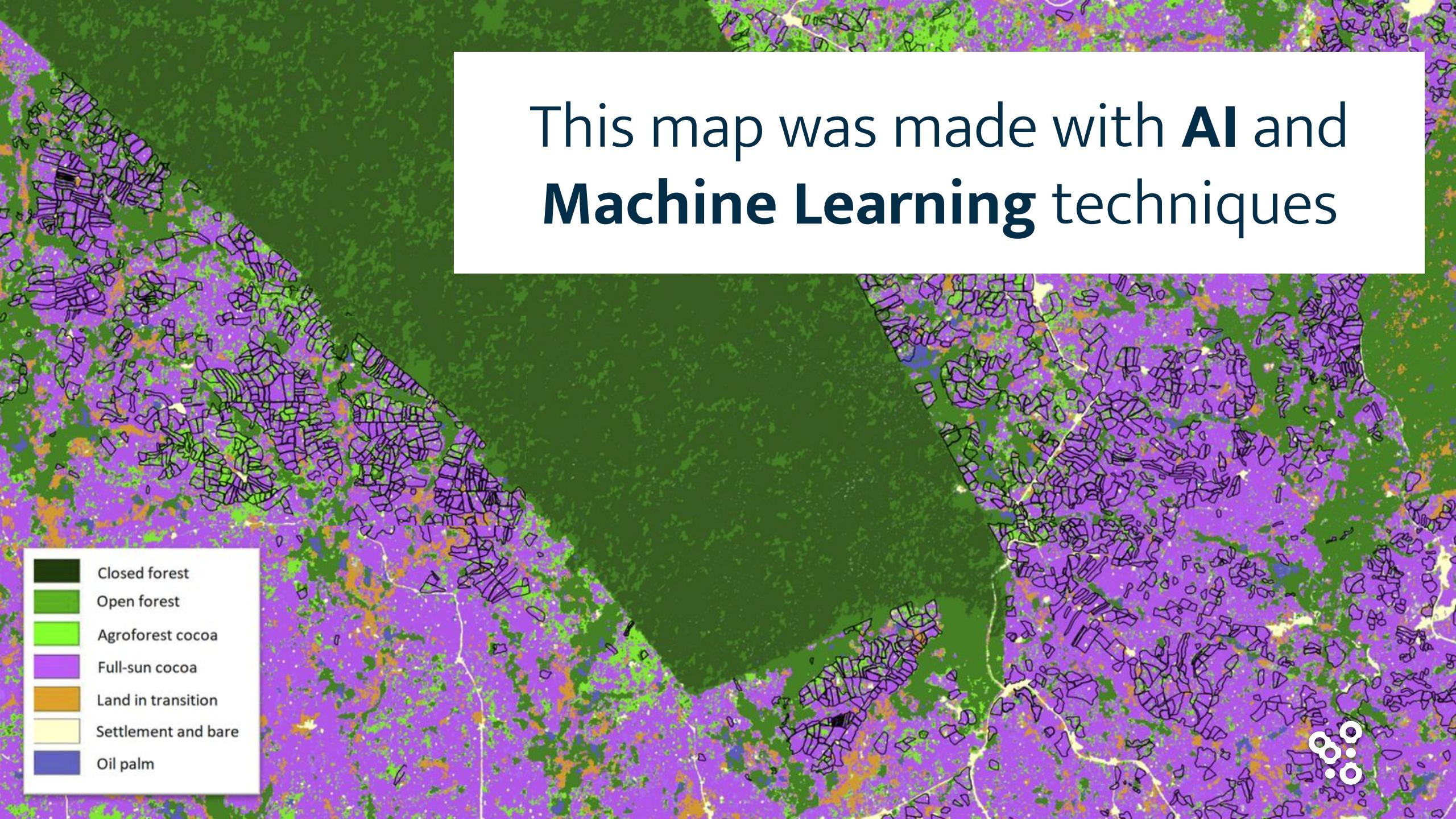


GIS (& RS) IN 2019

Data driven
Solutionist
Focused on attributes of self

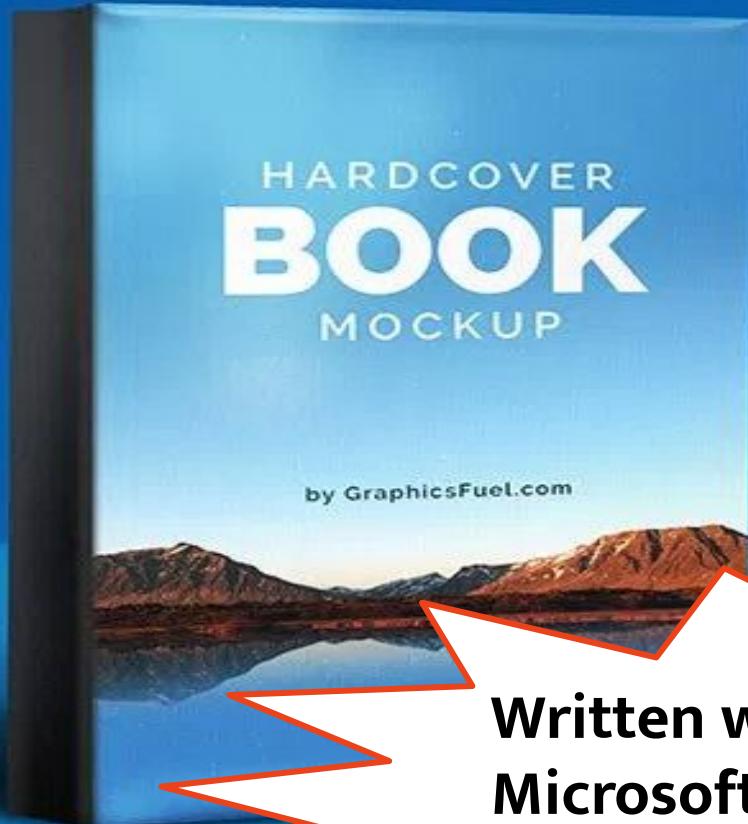






This map was made with **AI** and
Machine Learning techniques





**Written with
Microsoft Word!**



ANALYSIS READY DATA

Platforms like GEE, SentinelHub, ESA
Dias, DataCube



ANALYSIS READY DATA

From data to insights



Data



Data Information



Data Information Insights



Data
Information
Insights
Wisdom



!!! Bullshit Alert !!!

Data
Information
Insights
Wisdom



START WITH THE PROBLEM

What is the **problem** we are trying
to solve?

Who is having that problem?

Why do they have that problem?



Wisdom without action is an empty
shell





ACTION! towards DRD







FOREST

LUMI







Tumang

Sungai Siak

Sungai Siak

Sungai Siak

Sungai Siak

JALAN PEMDA SIAK-BUATAN

JALAN PEMDA SIAK-BUATAN

JALAN PEMDA SIAK-BUATAN





Sungai Siak

Sungai Siak

Tumang

Sungai Siak

Sungai Siak

Sungai Siak

Sungai Siak

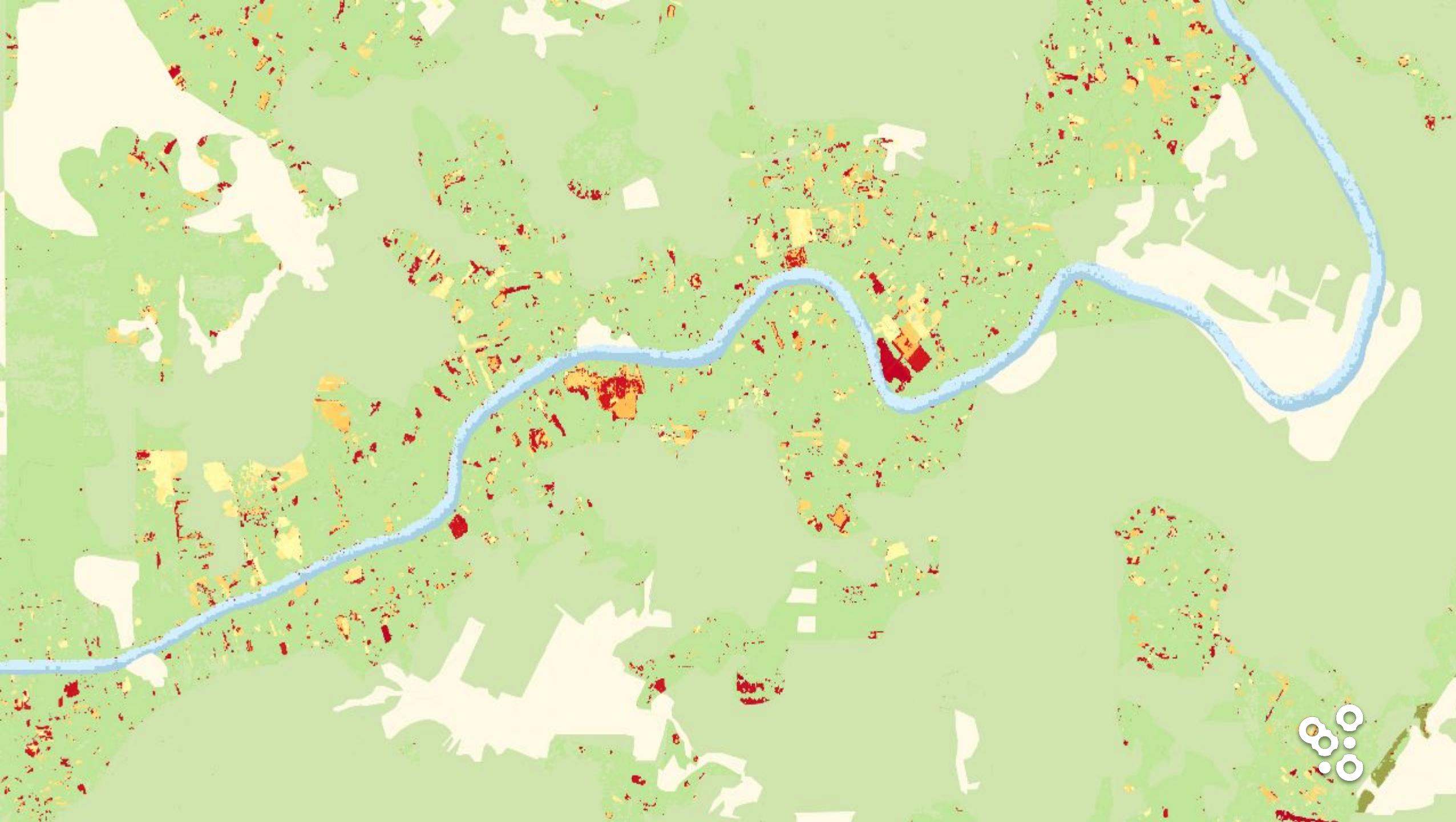
Sungai Siak

JALAN PENDASIAK-BUATAN

JALAN PENDASIAK-BUATAN

JALAN PENDASIAK-BUATAN







Highest exposure risk

Deforestation of protected forest has increased due to a big forest fire.

Between May 5 – May 18, 2018

Investment areas



INVESTIGATE →

VIEW DETAILS →

Key values natural capital

During the past two weeks, 1247 ha of forest has disappeared, of which 234 was protected forest. We also detected 25 issues that could lead to more deforestation and require investigation.

Deforestation

Forest cover - 12k ha ▼

1.247 ha loss

Issues

Fires

5 alerts



ALL PROTECTED FOREST

Deforestation alert – May 8, 2018

**320 ha deforestation
< 5 km from mill**

COMMENT ON ALERT →

#1808001 – Lat: 4.53 Long: 117.38

Possible cause

fire - 1 May 2018

340 ha burn scars detected

Recent deforestation in this location

30 ha deforested on May 5, 2018

50 ha deforested on May 1, 2018

Closest mills

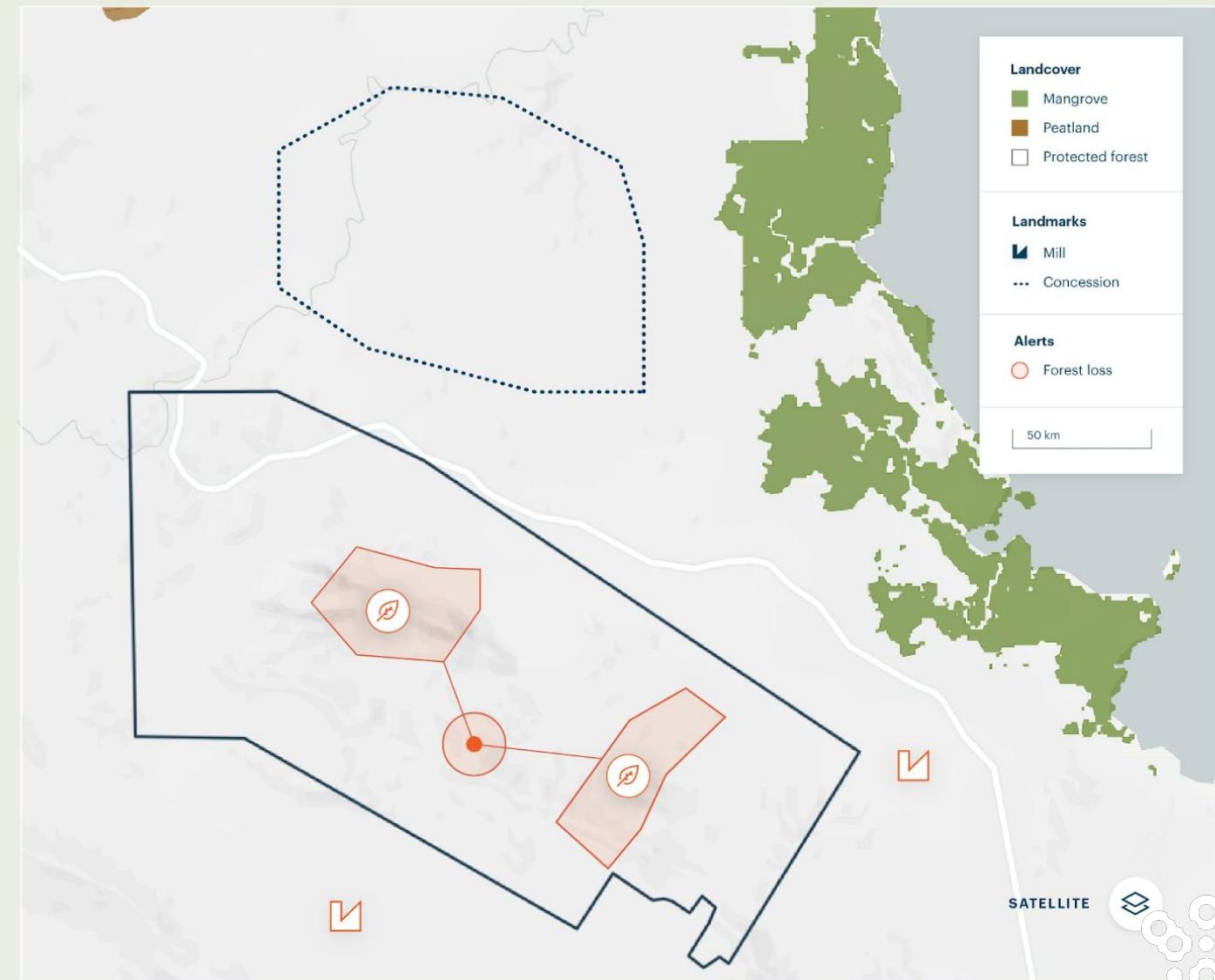
Serudung mill (19,26 km)

Konsep Muktamad (24,22 km)

VIEW MILL DETAIL →

VIEW MILL DETAIL →

SEND OBSERVER





ALL PROTECTED FOREST

Deforestation alert – May 8, 2018

320 ha deforestation
< 5 km from mill

[COMMENT ON ALERT →](#)

#1808001 – Lat: 4.53 Long: 117.38

Possible cause

fire - 1 May 2018

340 ha burn scars detected

Recent deforestation in this location

30 ha deforested on May 5, 2018

50 ha deforested on May 1, 2018

Closest mills

Serudung mill (19,26 km)

Konsep Muktamad (24,22 km)

[VIEW MILL DETAIL →](#)[VIEW MILL DETAIL →](#)[SEND OBSERVER](#)

DISCUSSION READY DATA

Put politics back in data!



DISCUSSION READY DATA

Start with the problem, then move
towards the data



REMOTE SENSING FOR SUSTAINABILITY

Understand the problem

Collaborate with local partners

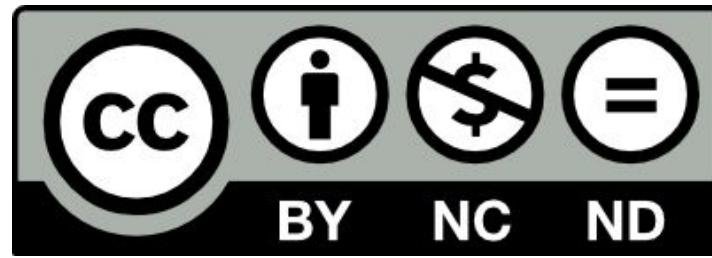
Design tailored solution

Select tools and data



@arjenvrieli

<https://medium.com/@vrieli>





SATELLIGENCE

Arjen Vrielink / Director
vrielink@satelligence.com