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# HOW TO START YOUR OWN **REMOTE SENSING** COMPANY



**BAD NEWS**

You will fail



**GOOD NEWS**

Life is not fun without failure





## INGREDIENTS

Satellite Data

Tools

Infrastructure

Trends





# SMART FOREST & COMMODITY **ANALYTICS**

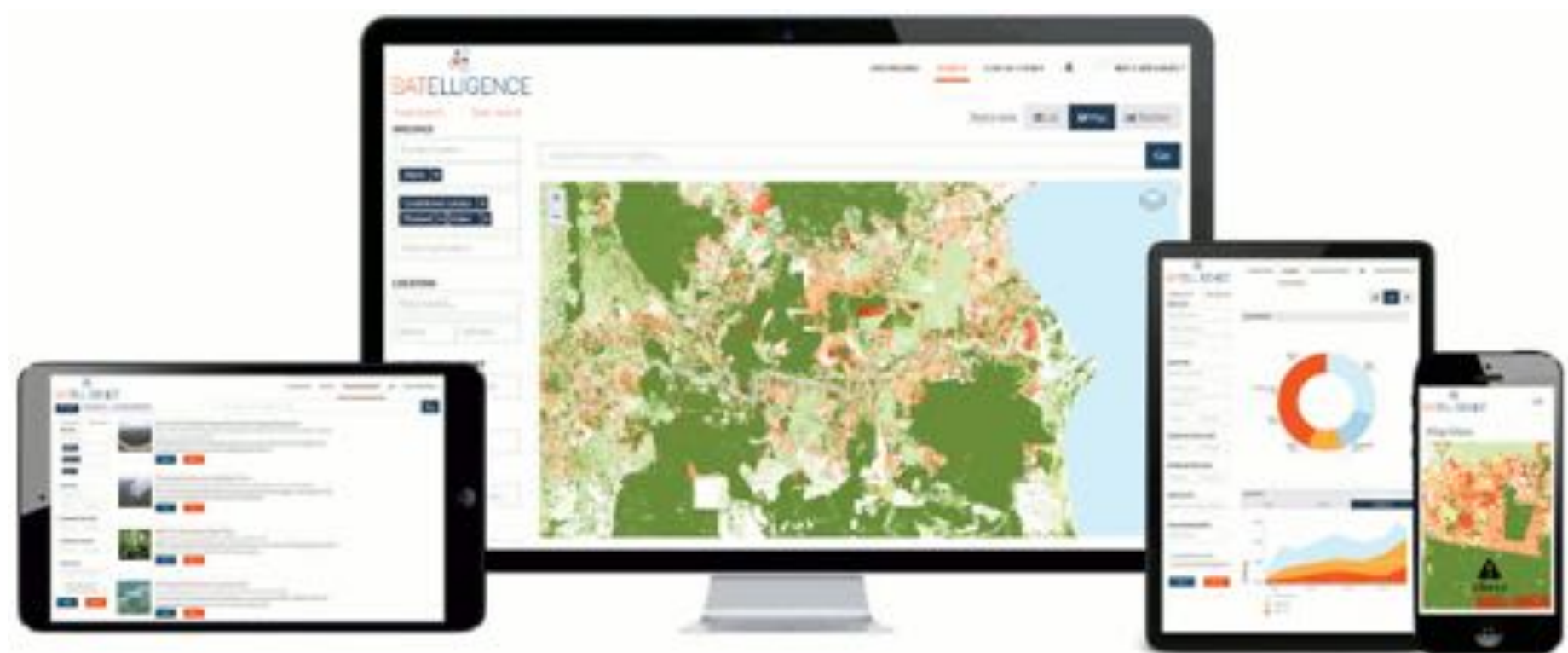


## FOOD SECURITY

How to **feed** 2 billion more mouths  
in 2030?



# CONTINUOUSLY UPDATED COMMODITY MAP OF THE WORLD







?





**Burkina Faso**

**Niger**



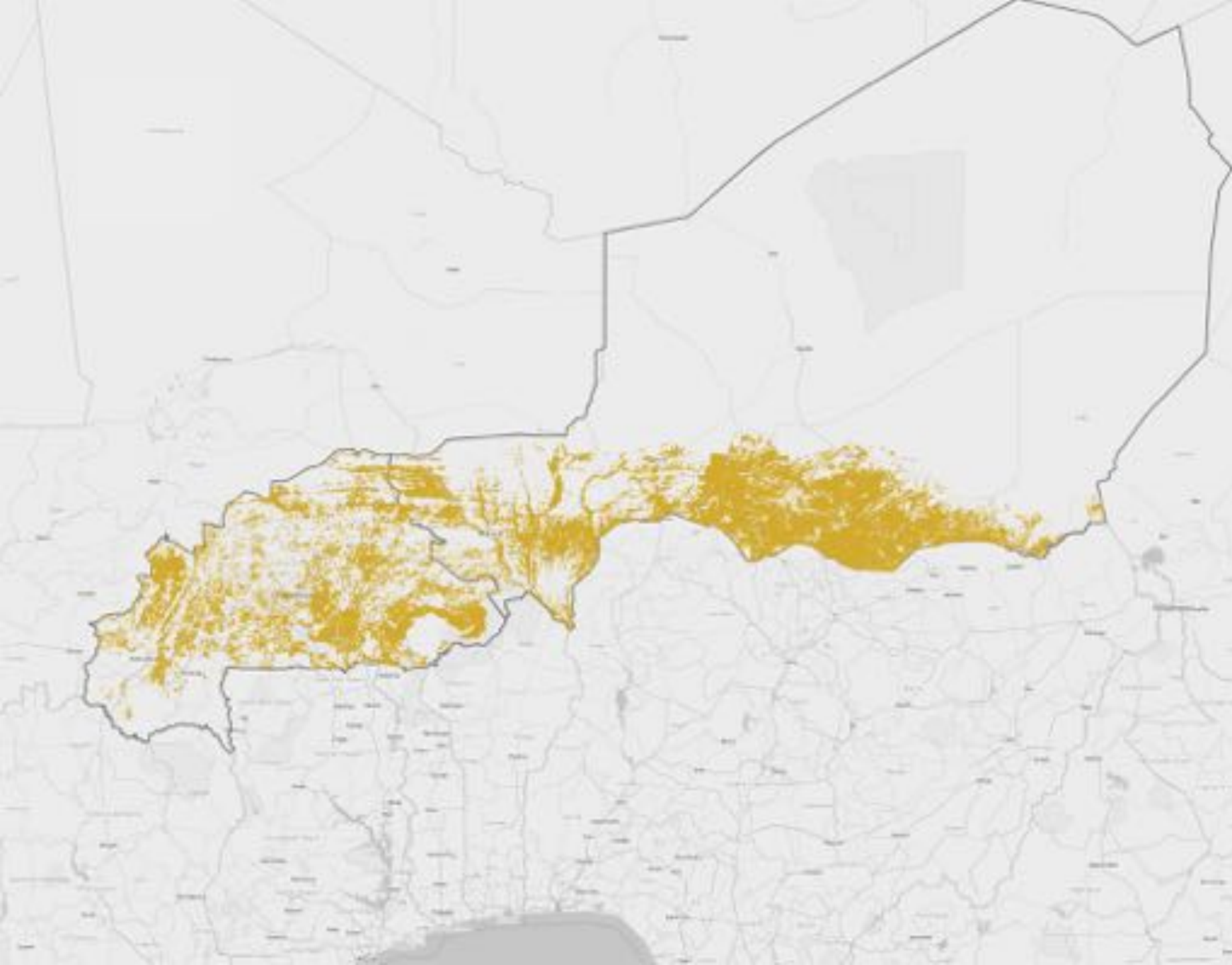


**Burkina Faso**

**Niger**







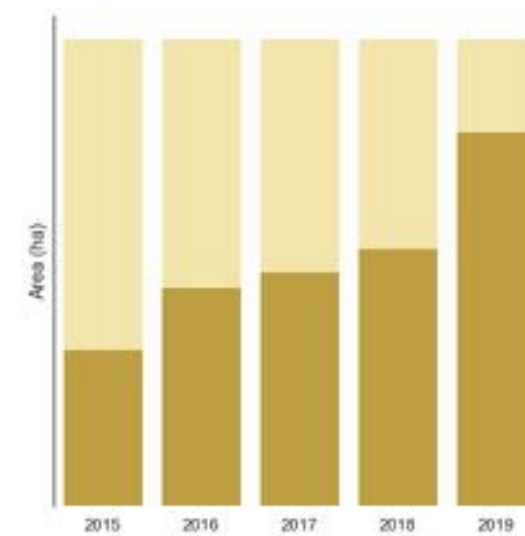
**Cultivated area**

● Cultivated area



## Analytics

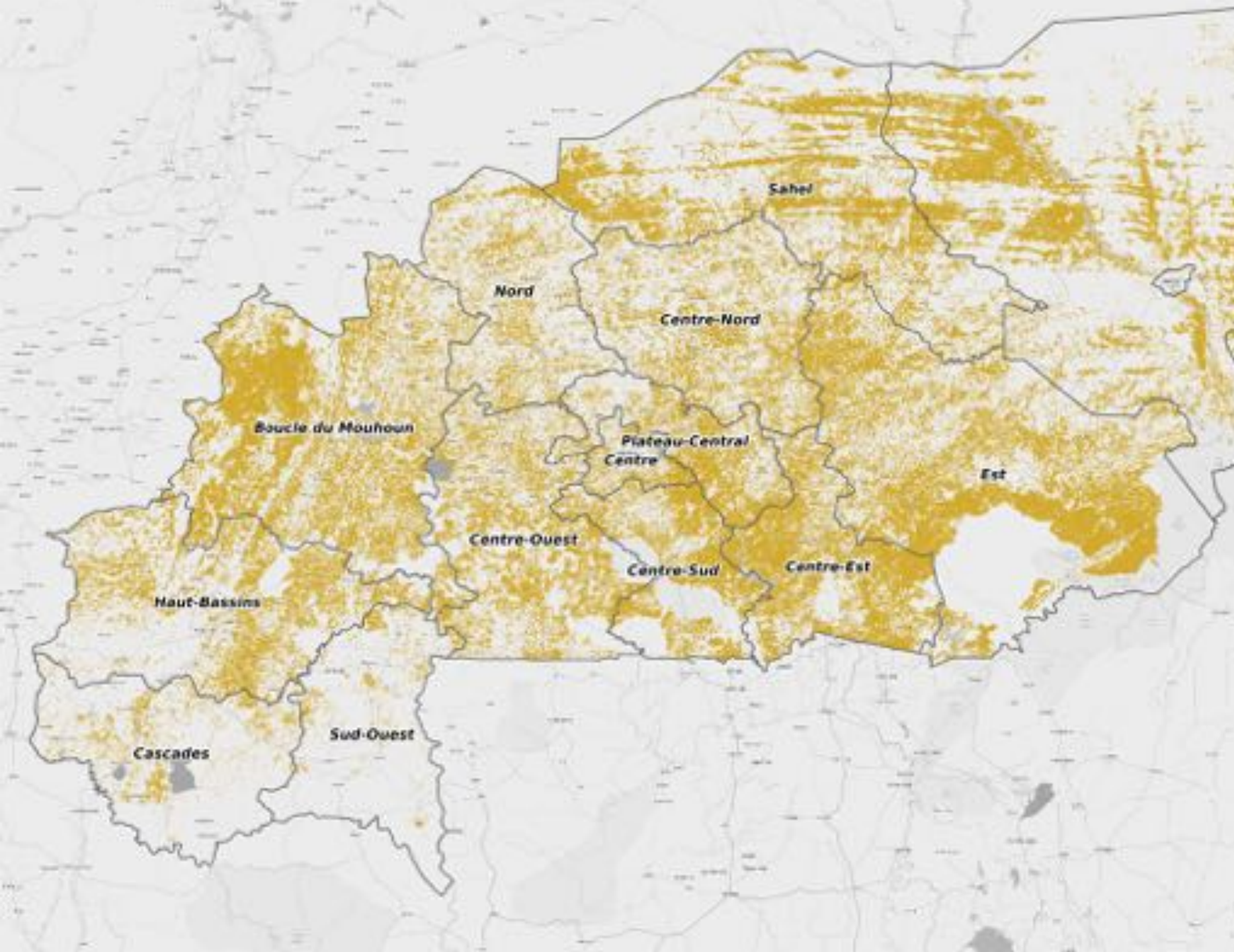
### Historical trends



● Cultivated area







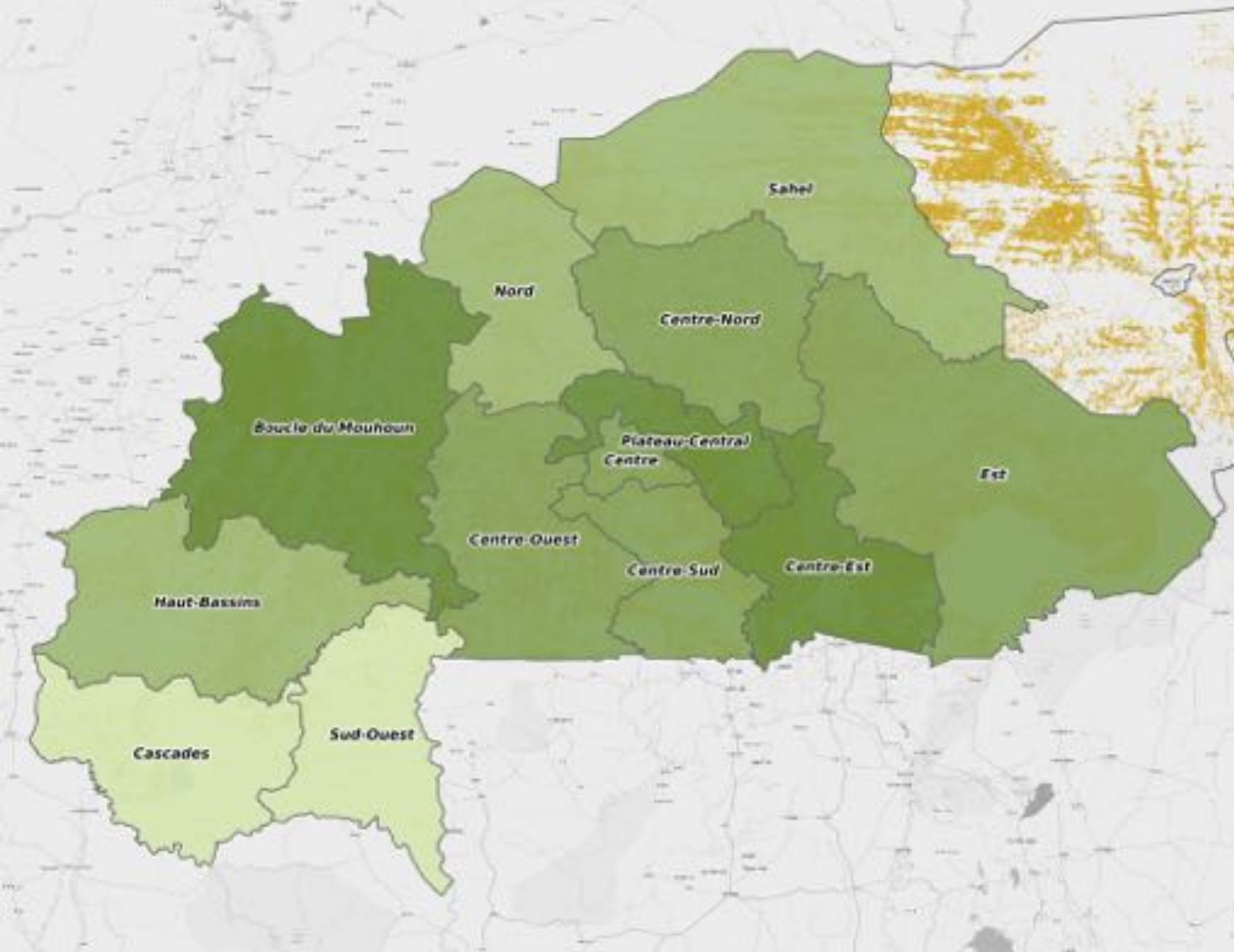
## Analytics

**Zoom** in to compare provinces

● Cultivated area







## Analytics

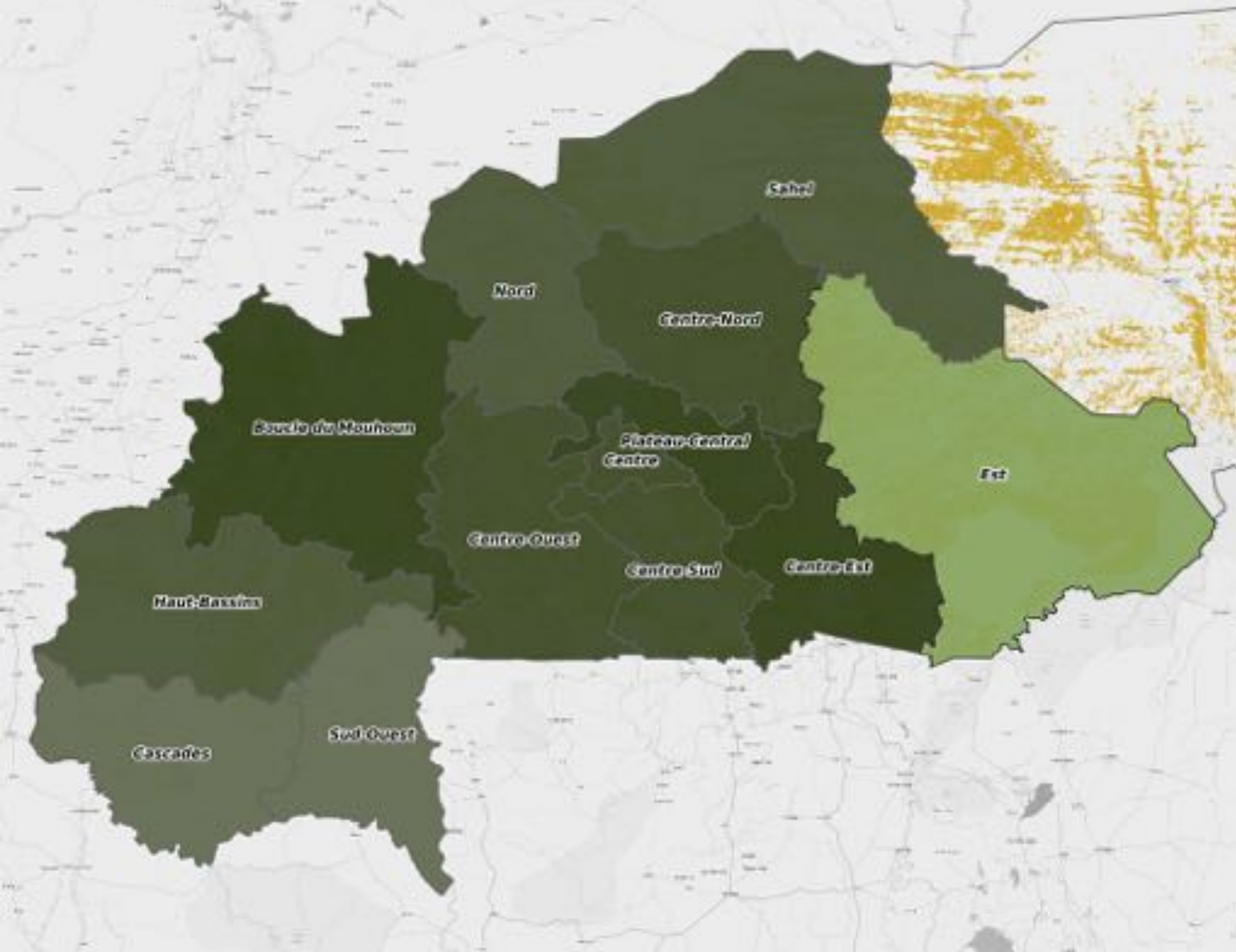
**Zoom** in to compare provinces

Add data components like **productivity**

And get **reports**

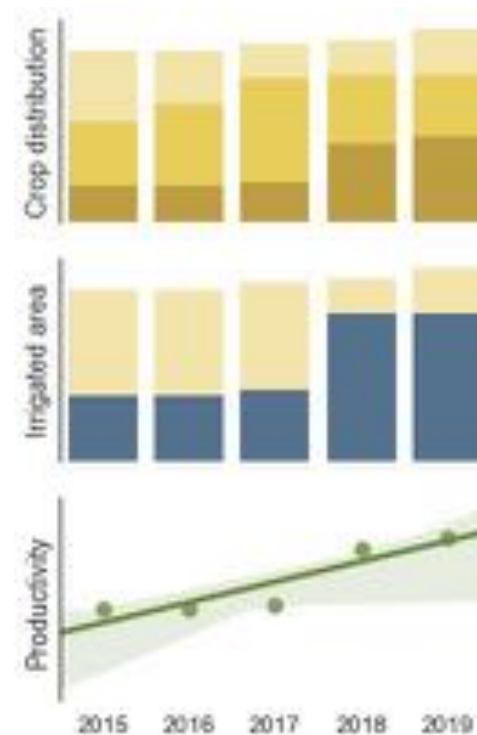
 Cultivated area





# Est

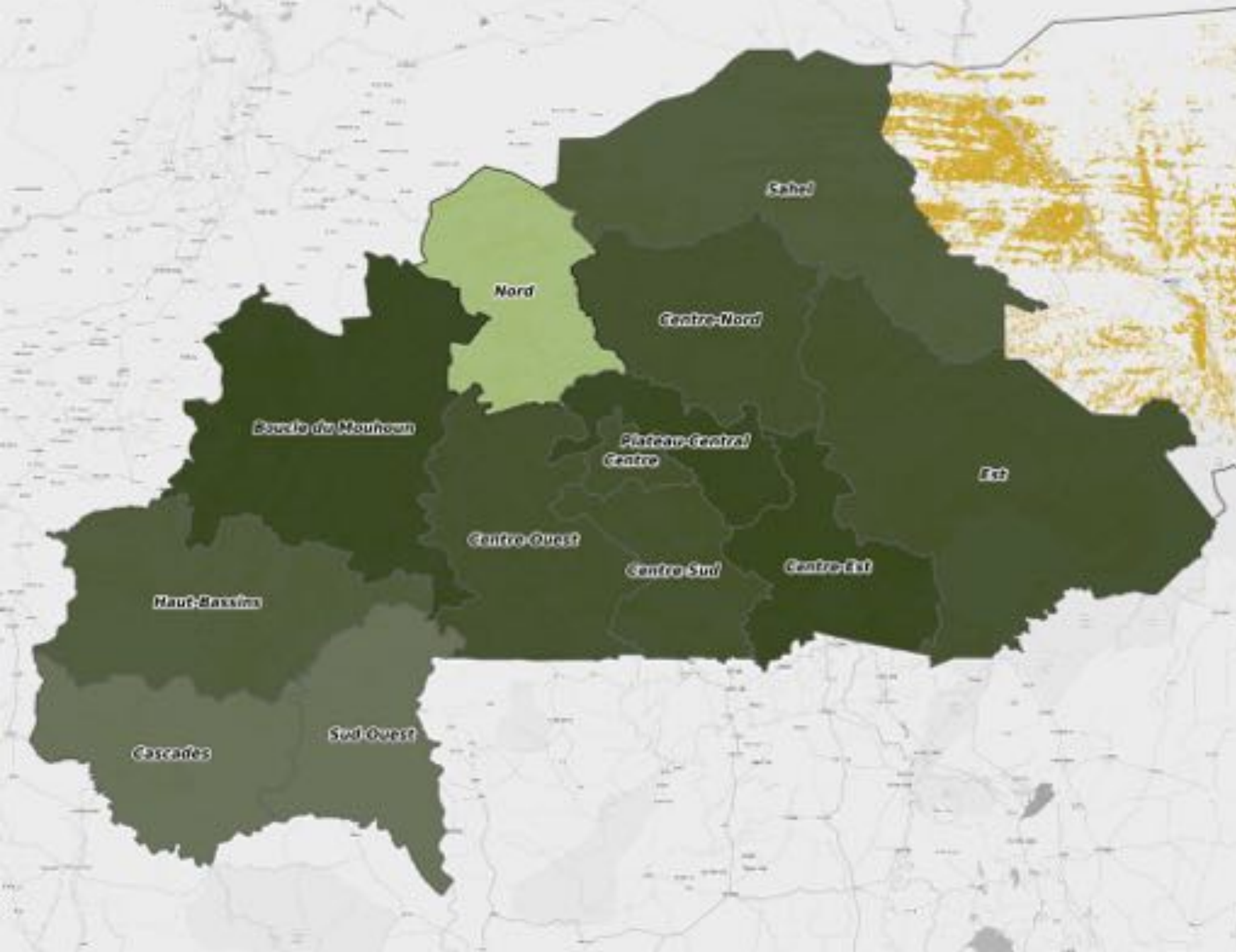
analytics



- Cultivated area
- Maize
- Rice
- Irrigated area

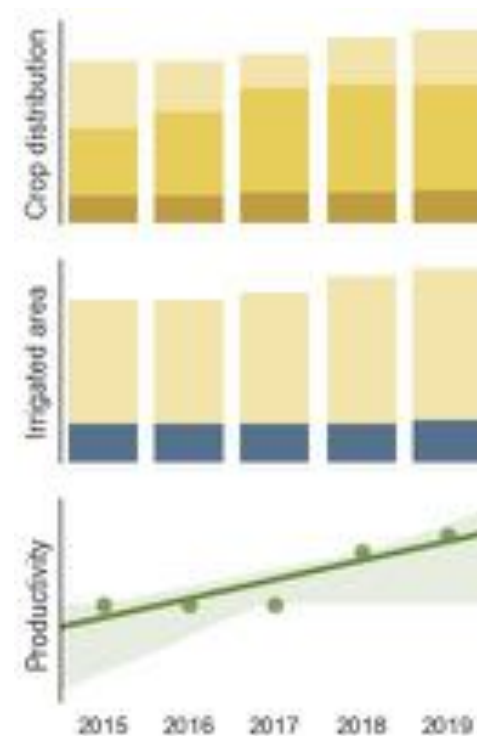






# Nord

analytics



-  Cultivated area
-  Maize
-  Rice
-  Irrigated area





## ABOUT OUR POSITIVE IMPACT

We create **actionable** information from space data to enable our clients to **feed the world** while protecting the world's **natural resources**



# SATELLITE DATA



# SATELLITE DATA

1. Open satellite data
  - a. NASA: Landsat
  - b. ESA: Sentinel 2, Sentinel 1
2. Sentinel 2 bands: true color, false color
3. Search & Download







**SENTINEL 2**

**TRUE COLOR**

**10m**

**2018-06-30**







SENTINEL 2

FALSE COLOR

20m

2018-06-30

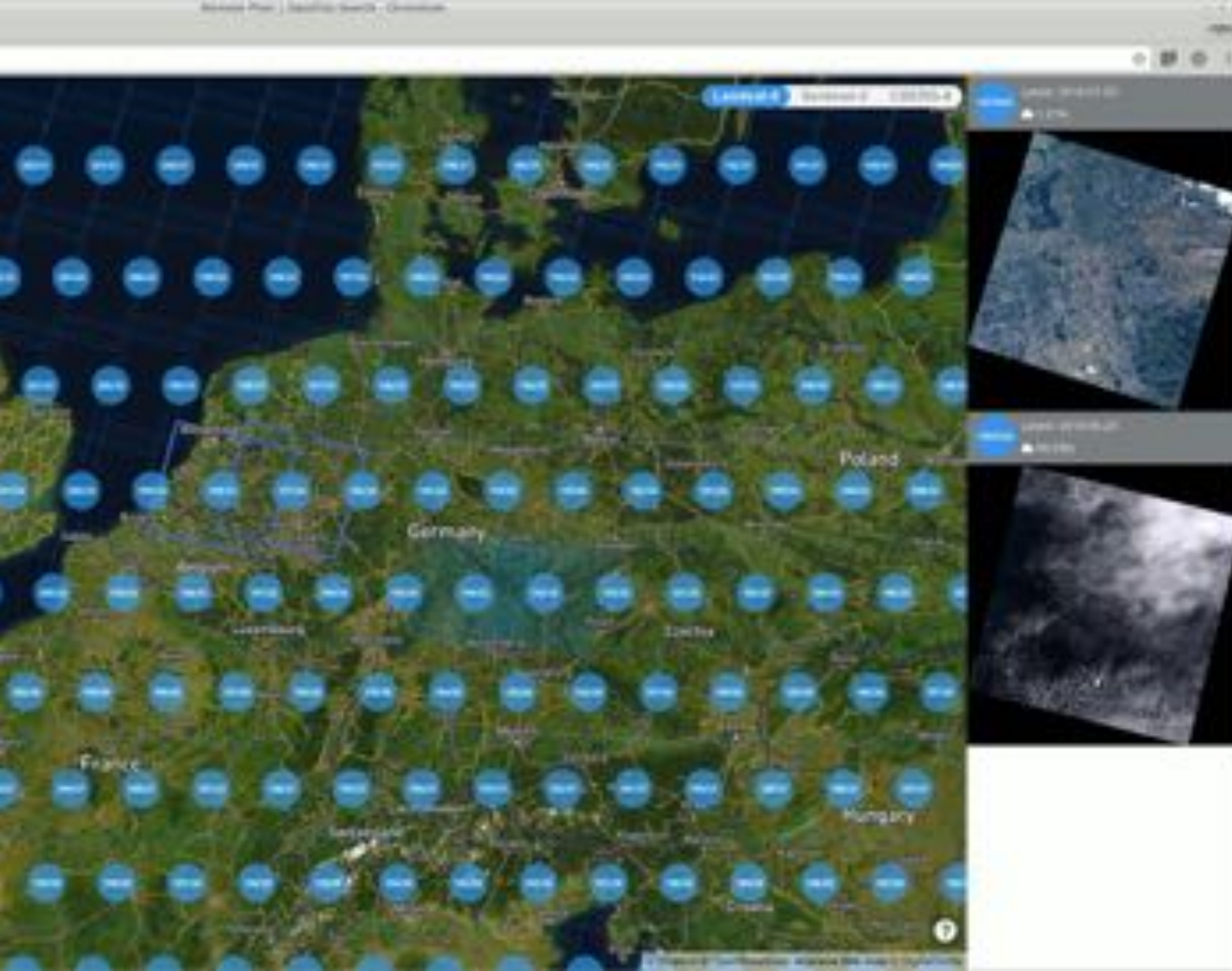


## SEARCH & DOWNLOAD

1. Remote Pixel [search.remotepixel.ca](https://search.remotepixel.ca)
2. Copernicus Hub [scihub.copernicus.eu](https://scihub.copernicus.eu)







**SEARCH**

[search.remotepixel.ca](https://search.remotepixel.ca)

**Sentinel 2**

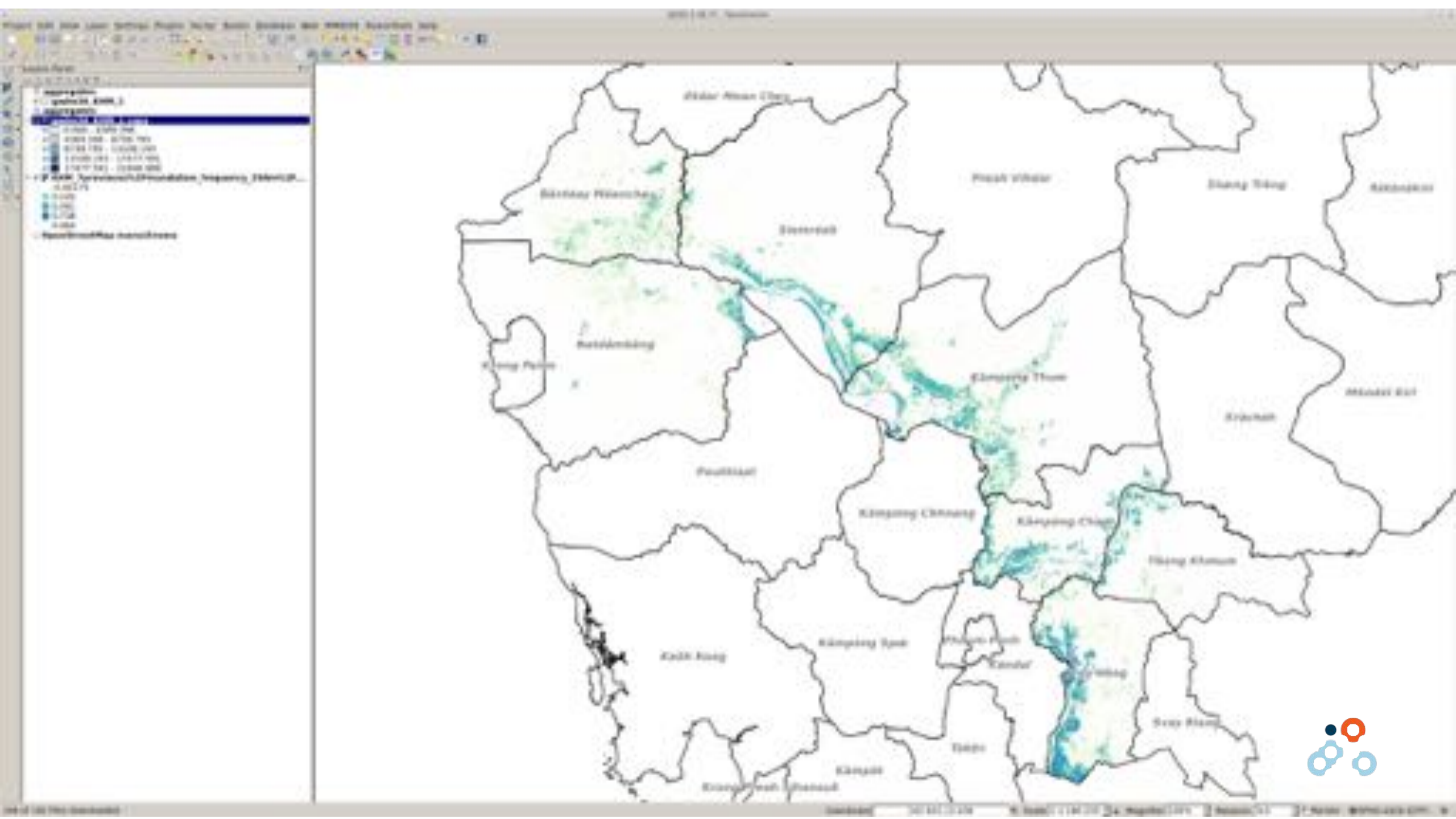
**Landsat**





# TOOLS







Available in French and Spanish at \$19.95

USARP

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The chief architect of the new built-in financial processing and analysis tool is the following technological knowledge: Economics, Logistics, Finance, such as: capital, income, tax, distribution, Total Quality Management, and a high processing knowledge.

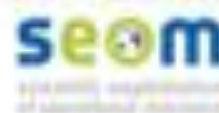
### Feature Highlights

- **Design process** is an **art** (freedom)
- **Very fast image display and navigation** over a **large set** of images
- **Direct Manipulation Manipulator** (DMM) for **coarse and refined** navigation (eg)
- **Advanced image manipulation** allows **splitting and manipulation** of **real** images with **an image of clear bands**, images from **80% zoom to 200%** (eg)
- **3D image of interest** **defined** for **rotation and zoom** (eg)
- **Fast image rotation and zoom**
- **Flexible hand controls** using **simple mathematical expression**
- **Locally manipulation and auto-recognition** to **correct** any **problem**
- **Coarse and navigation** using **global control panel**
- **Automatic 3D to 2D** **conversion** and **rotation**
- **Product** **library** for **reusing** and **integrating** **large** **systems** **efficiently**
- **Multi-handling** and **Multi-user** **support**
- **Advanced** **image** **manipulation**

### USAP Frequently Asked Questions

There is a large, flat, rectangular, brownish-grey

- † *prob404* – multi-attribute evaluation failed.



2019



Downloaded from <http://ajphaphysiol.phapublications.org/> on September 11, 2012

[illegible]

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2017



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## TOOLS

**SATELLIGENCE CLASSIFIER**  
**XGBoost / Random Forest ML**

<https://gitlab.com/satelligence/classifier>





## TOOLS: PROGRAMMING

Python Python Python  
Python Python

Numpy

Dask

Scipy

Pandas

Xarray

Python Python

```
31 self.file = None
32 self.fingerprints = set()
33 self.logdups = True
34 self.debug = debug
35 self.logger = logging.getLogger(__name__)
36 if path:
37     self.file = open(os.path.join(path, "report"), "w")
38     self.file.seek(0)
39     self.fingerprints.update(self.request_fingerprint(request))
40
41 @classmethod
42 def from_settings(cls, settings):
43     debug = settings.getbool("SUPERMIM_JOB_DEBUG")
44     return cls(job_dir(settings), debug)
45
46 def request_seen(self, request):
47     fp = self.request_fingerprint(request)
48     if fp in self.fingerprints:
49         return True
50     self.fingerprints.add(fp)
51     if self.file:
52         self.file.write(fp + os.linesep)
53
54 def request_fingerprint(self, request):
55     return request_fingerprint(request)
```

# INFRASTRUCTURE







## INFRASTRUCTURE DEV

Google Earth Engine  
SentinelHub  
Dias (ESA)

Cloud (AWS, GCE, Digital  
Ocean)

Your laptop





## INFRASTRUCTURE PRODUCTION

Google Earth Engine  
SentinelHub  
Dias (ESA)

**Cloud** (AWS, GCE, Digital Ocean)

~~Your laptop~~







## INFRASTRUCTURE CLOUD

The data is already there

Standards are moving to  
**cloud native**  
**geoprocessing** (trends)



# TRENDS





# TRENDS

## Cloud Native Geoprocessing

- COG
- ARD
- SPAT

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



## TRENDS CLOUD NATIVE GEOPROCESSING

# Step-by-Step Guide to Building a Big Data Portal

<https://medium.com/pangeo/step-by-step-guide-to-building-a-big-data-portal-e262af1c2977>





## TRENDS CLOUD NATIVE GEOPROCESSING

# Step-by-Step Guide to Building a Big Data Portal

1. Place your Big Data in cloud object storage in a self-describing, cloud-optimized format.
2. Congratulations! Your Big Data Portal is now complete.

Take the rest of the day off.

<https://medium.com/pangeo/step-by-step-guide-to-building-a-big-data-portal-e262af1c2977>



# TRENDS WHO TO FOLLOW

RadiantEarth

DevelopmentSeed

Mapbox



**SUCCESS!**





# HOW TO START YOUR OWN **REMOTE SENSING** COMPANY



## RECIPE

1. Download & explore **satellite images**
2. Get your **tools**
3. Pick your **platform**
4. Ride the **trend** wave
5. **Conquer world**











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## WHY YOU WILL FAIL

Clouds & Haze

Sensor artefacts

Scaling (your laptop is too small)

Lack of training, calibration, validation data

