

# → EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT

## Agriculture and Rural Development

InfoSession

25 July 2018 | ADB, Manilla, Philippines

## Session 3 – Inundation Frequency Mapping

Project Consortium, presented by Arjen Vrielink, Satelligence



Nelen & Schuurmans



Satelligence



# The consortium of EO4SD – Agriculture and Rural Development

## SERVICE PROVISION ▼



## DATA INTEGRATION ▼

Nelen & Schuurmans



THE NETHERLANDS

## CAPACITY DEVELOPMENT ▼



## COMMUNICATION ▼



## FOOD SECURITY

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





***INCREASE* AGRICULTURAL PRODUCTIVITY**

***DECREASE* AGRICULTURAL RISKS**

# ***INUNDATION FREQUENCY ??????***

# INUNDATION MAPPING & ANALYTICS

Inundation: floods versus irrigation

Opportunities for Earth Observation based services

Local context & applications

From data to actionable service

# INUNDATION

## Floods vs Irrigation







## **FLOODS**

Infrastructure  
**damage**

Erosion & Land  
**degradation**

**Crop loss**

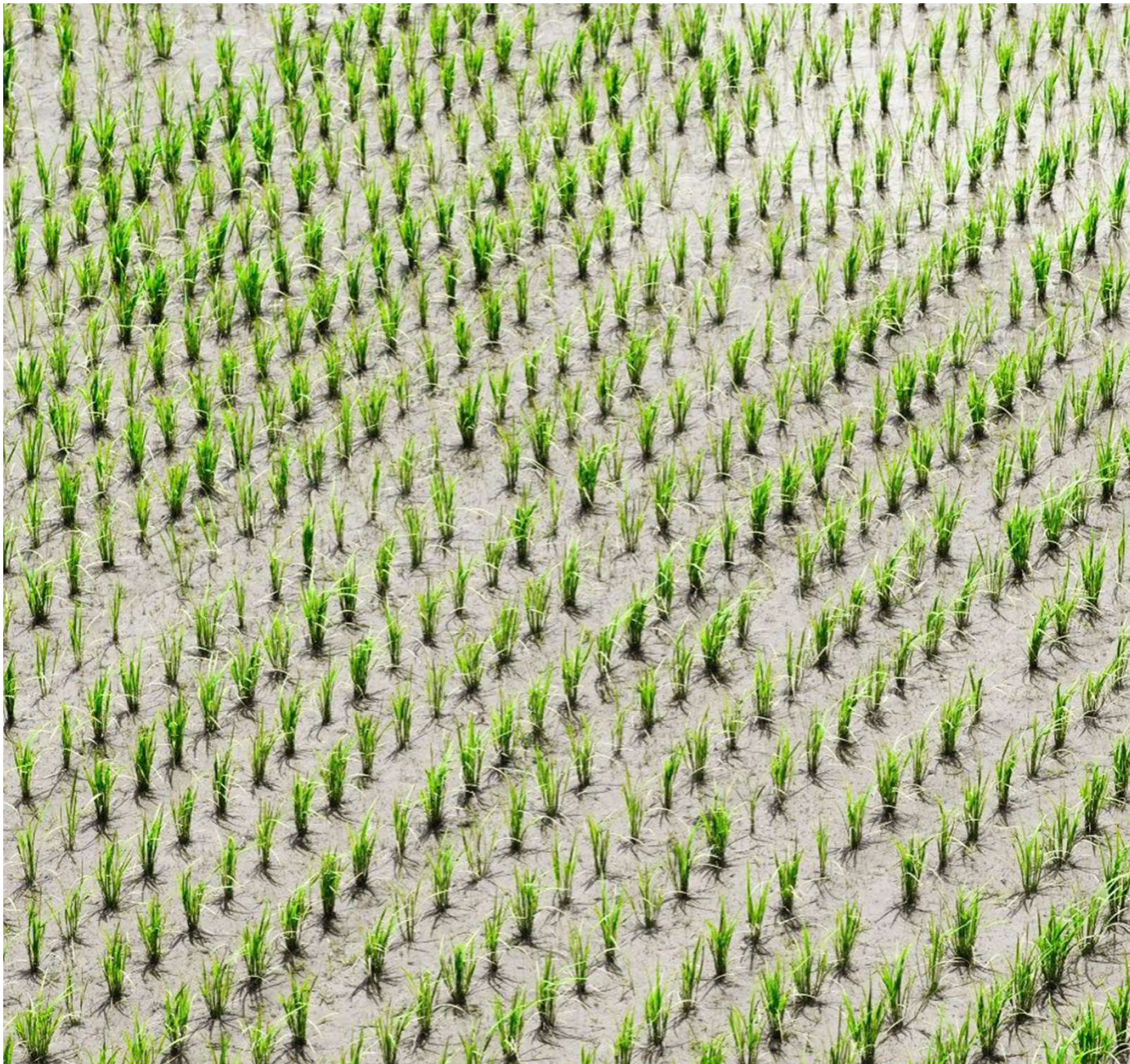
Food **security**

**Salinisation**  
(delta's)









## IRRIGATION

Increase  
productivity



**why earth observation based services?**

Cloud cover?

Leverage investments:  
scale through space & time

## CLOUD COVER: RADAR (Bangladesh)



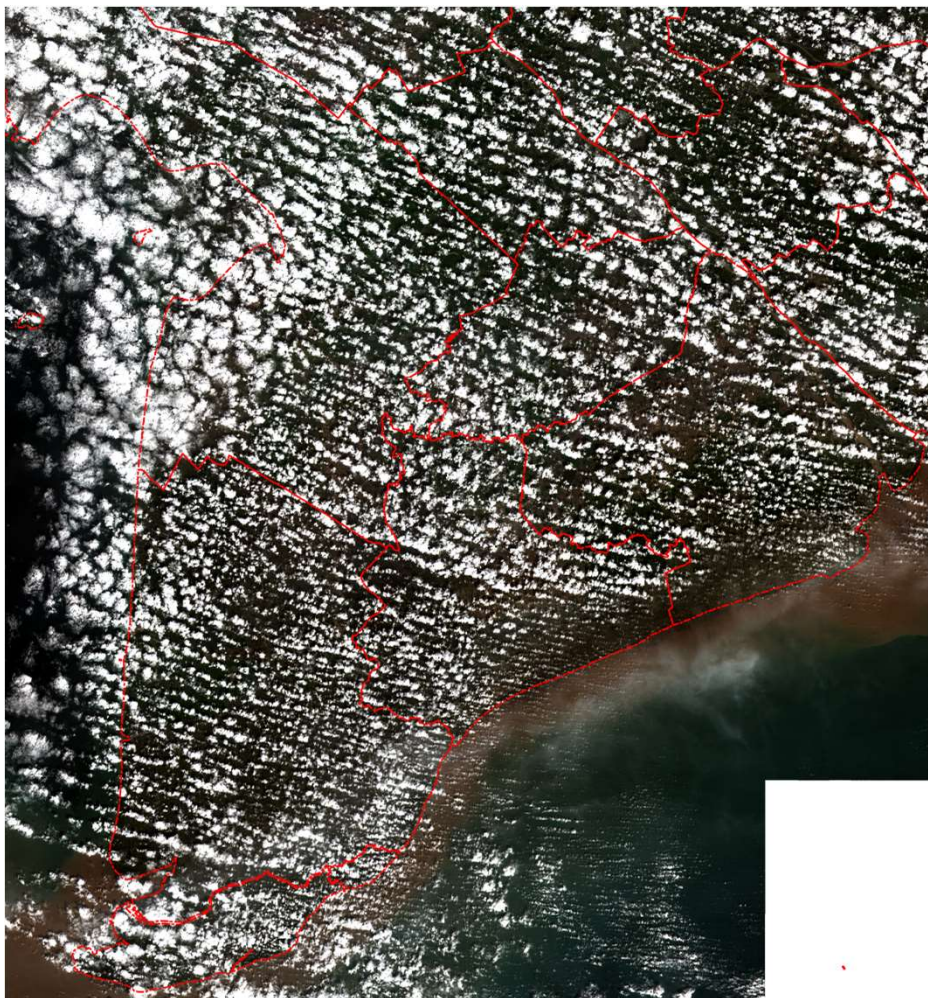
SPOT5 image 20111107



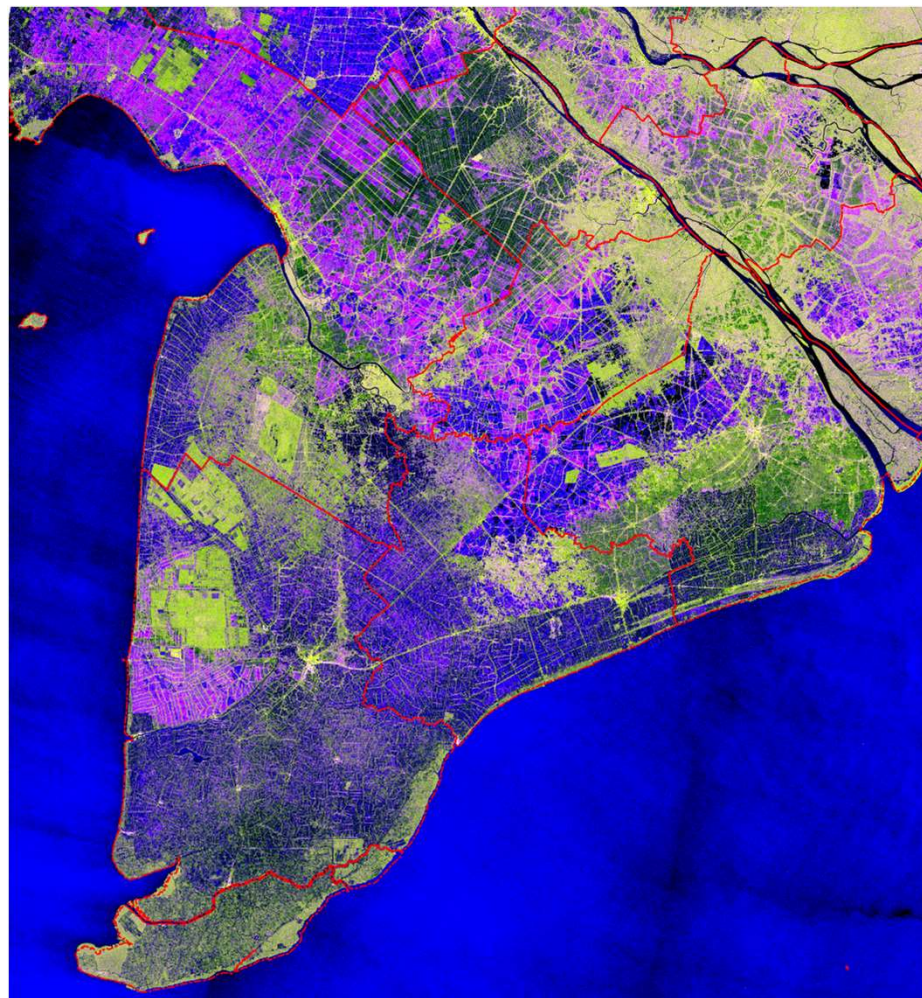
Sentinel1 multi-temporal image composite



## CLOUD COVER: RADAR (Vietnam, Mekong)



Sentinel-2 20180106



Sentinel-1 20180106







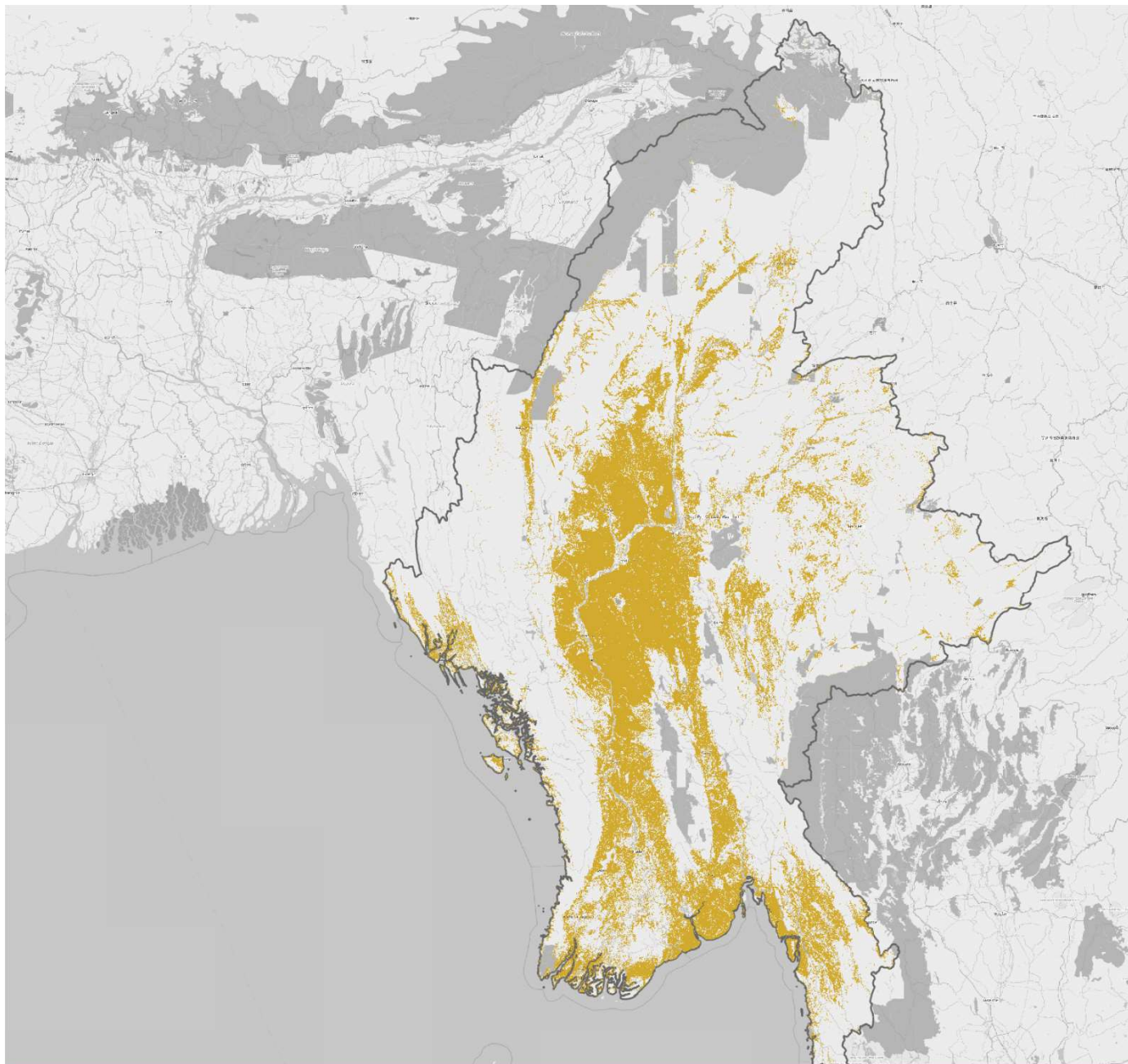


## Myanmar



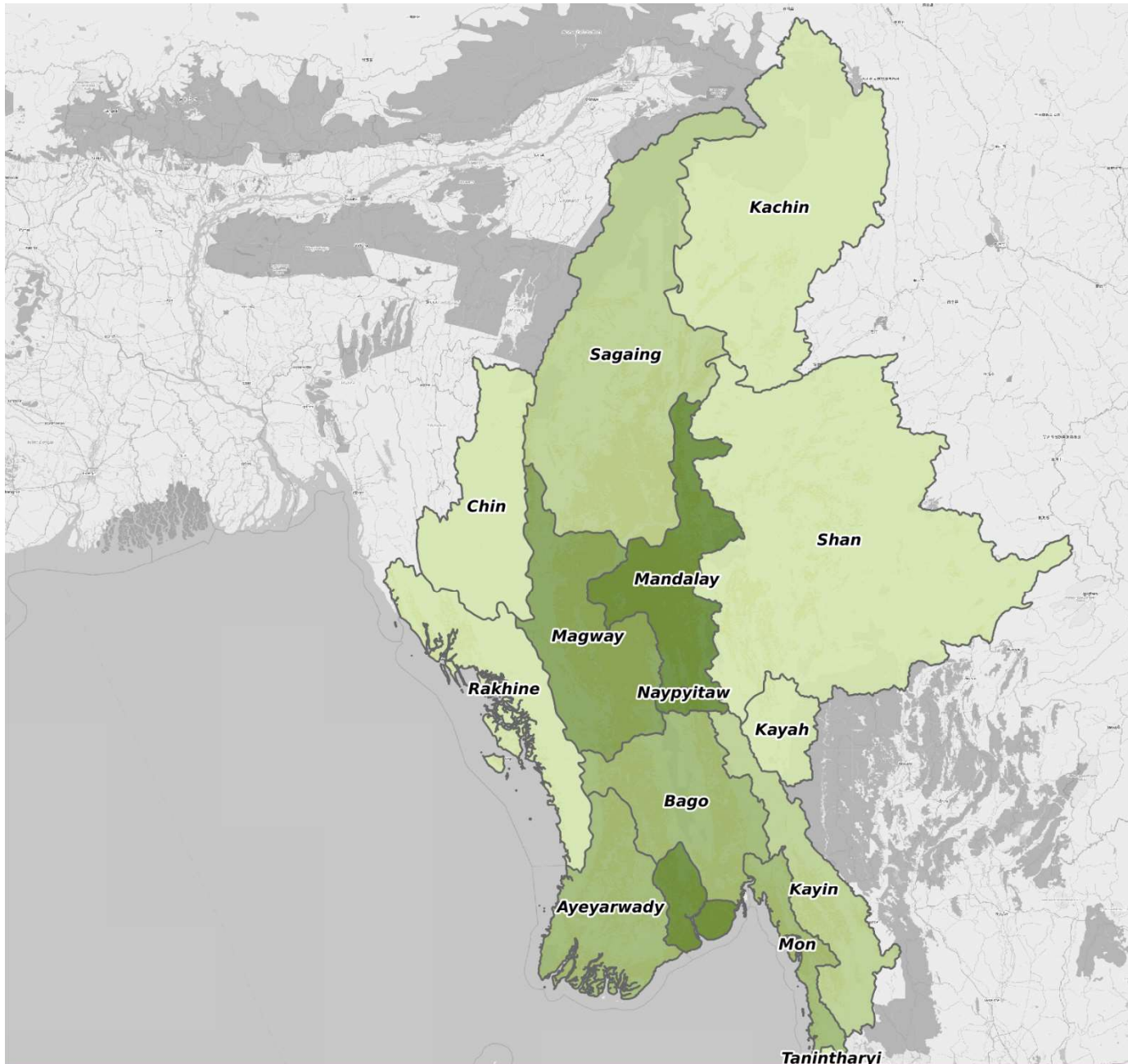
## Myanmar





Cultivated area

● Cultivated area



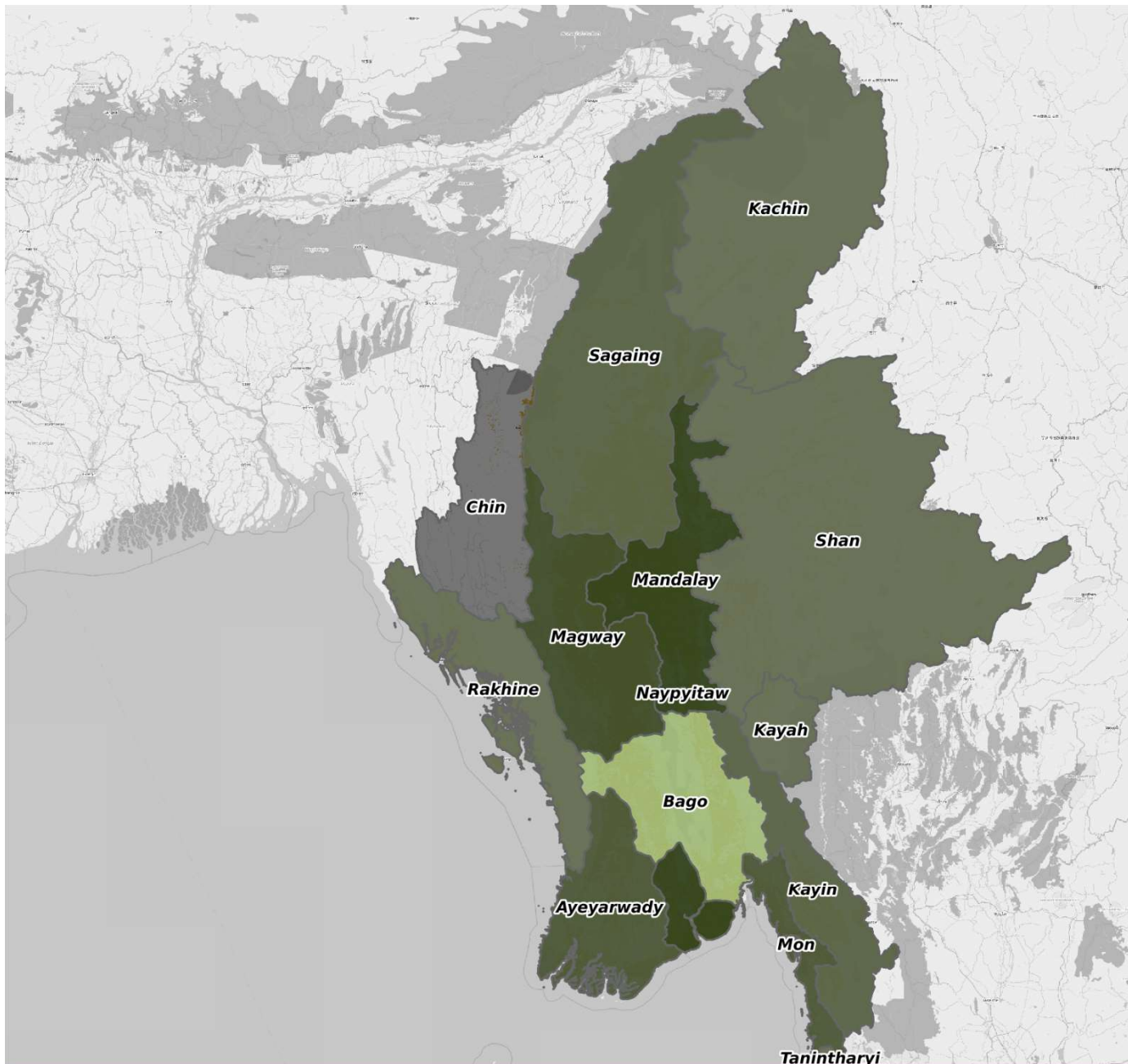
## Analytics

**Zoom** in to  
compare  
provinces

Add data  
components like  
**productivity**

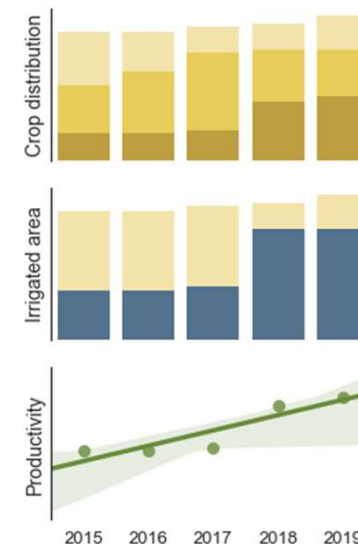
And get **reports**



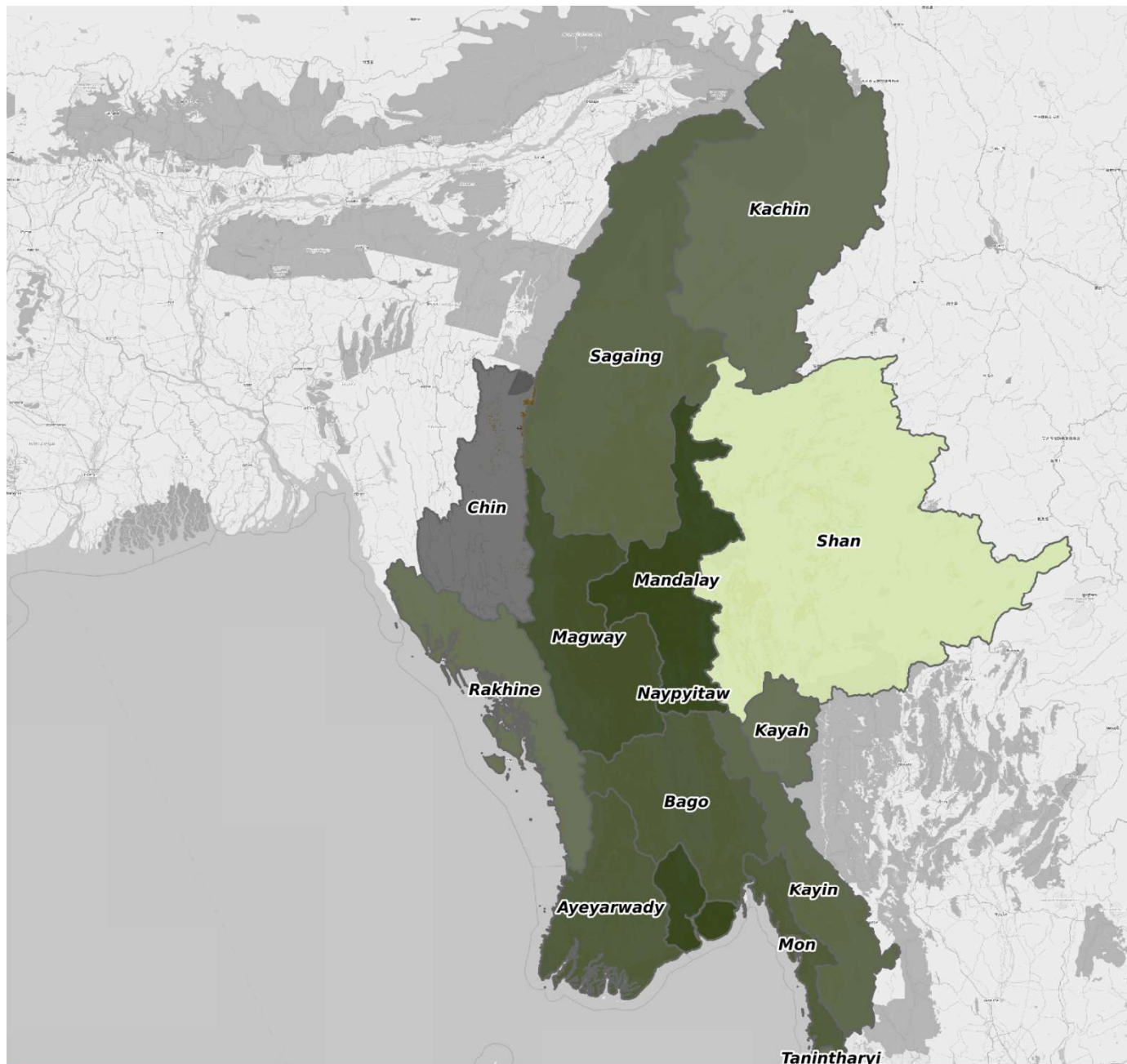


# Bago

analytics

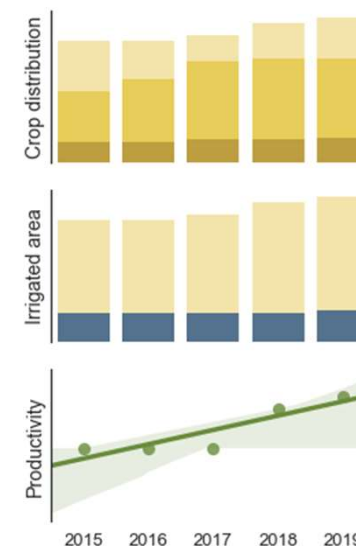


- Cultivated area
- Maize
- Rice
- Irrigated area



# Shan

analytics



- Cultivated area
- Maize
- Rice
- Irrigated area

## **EARTH OBSERVATION BASED SERVICES**

Real time (radar)  
Reliable & Unbiased  
Relevant

## LOCAL CONTEXT & APPLICATIONS

Myanmar

Cambodia

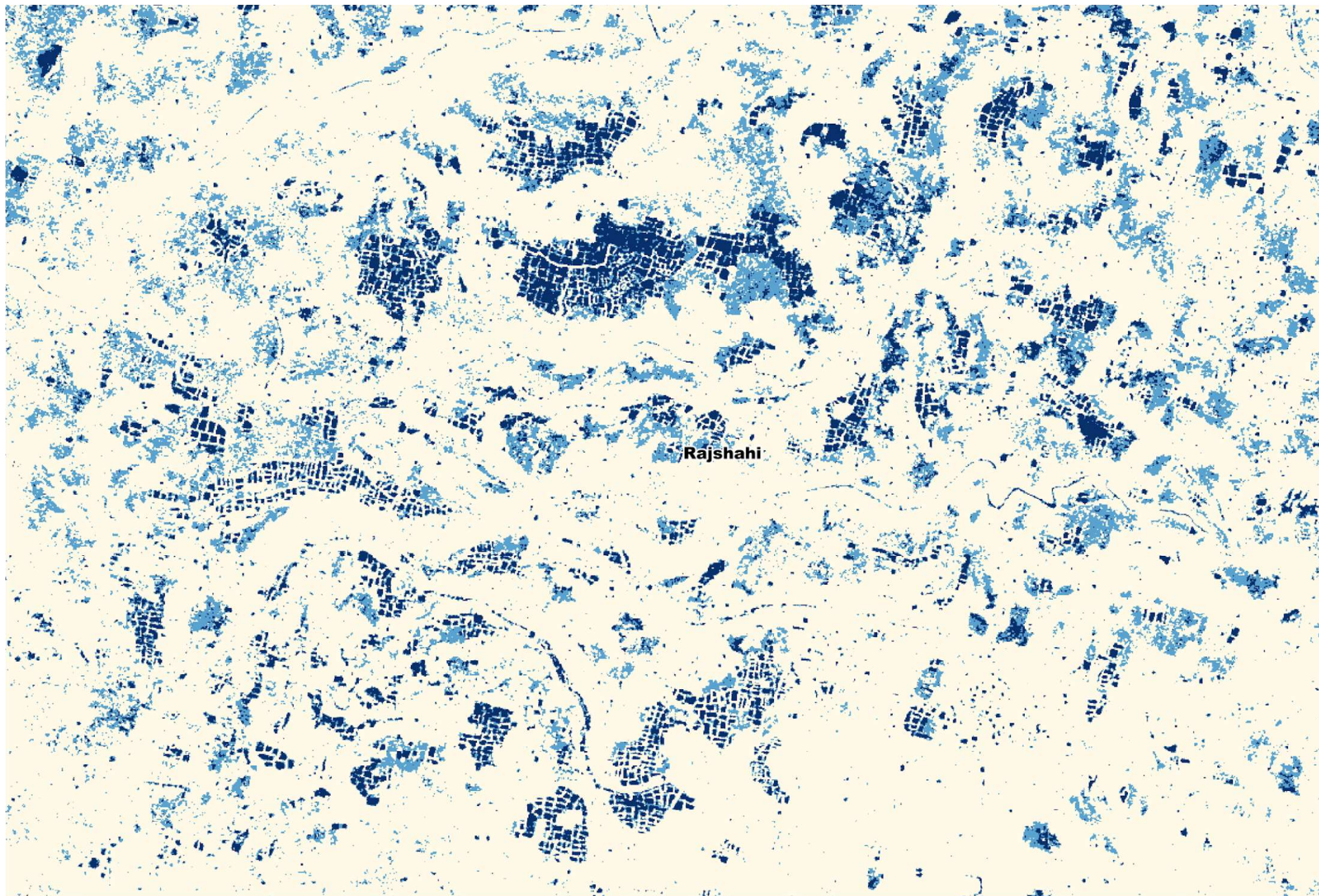
Bangladesh

Vietnam & Thailand

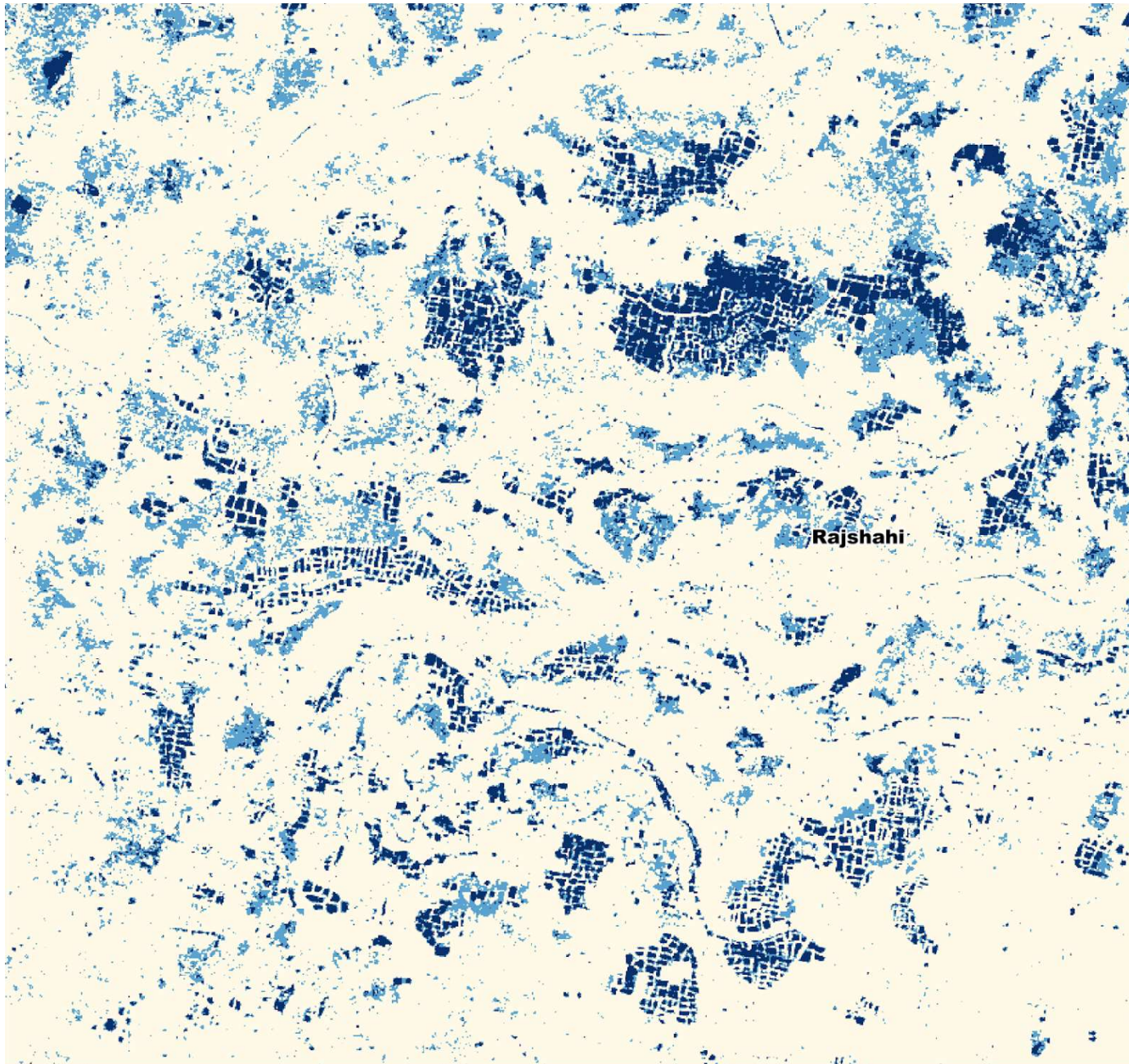
## **CROPPING PATTERNS**

# Myanmar & Bangladesh VS Vietnam & Thailand









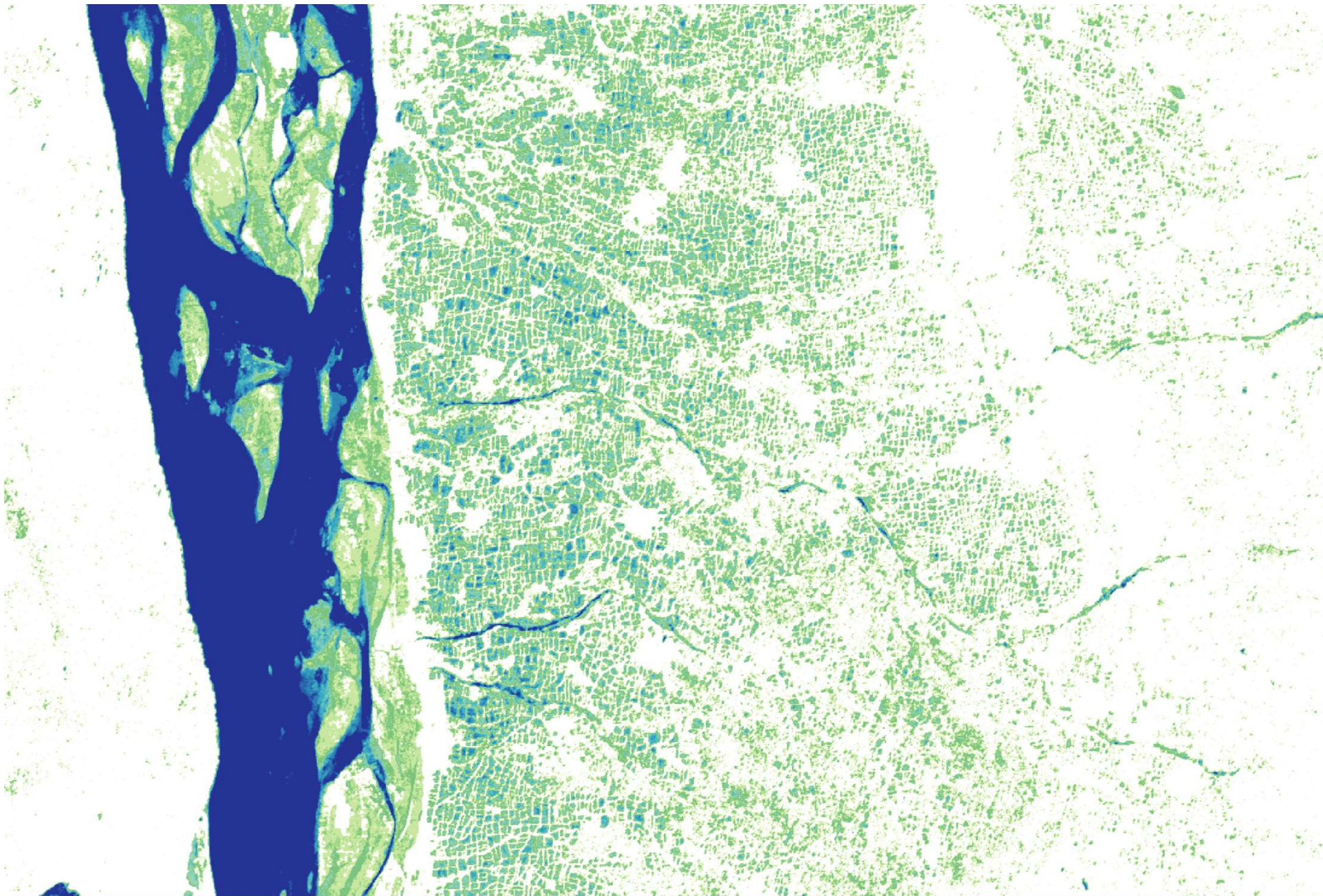
## BANGLADESH

**dark blue:**  
permanently  
inundated

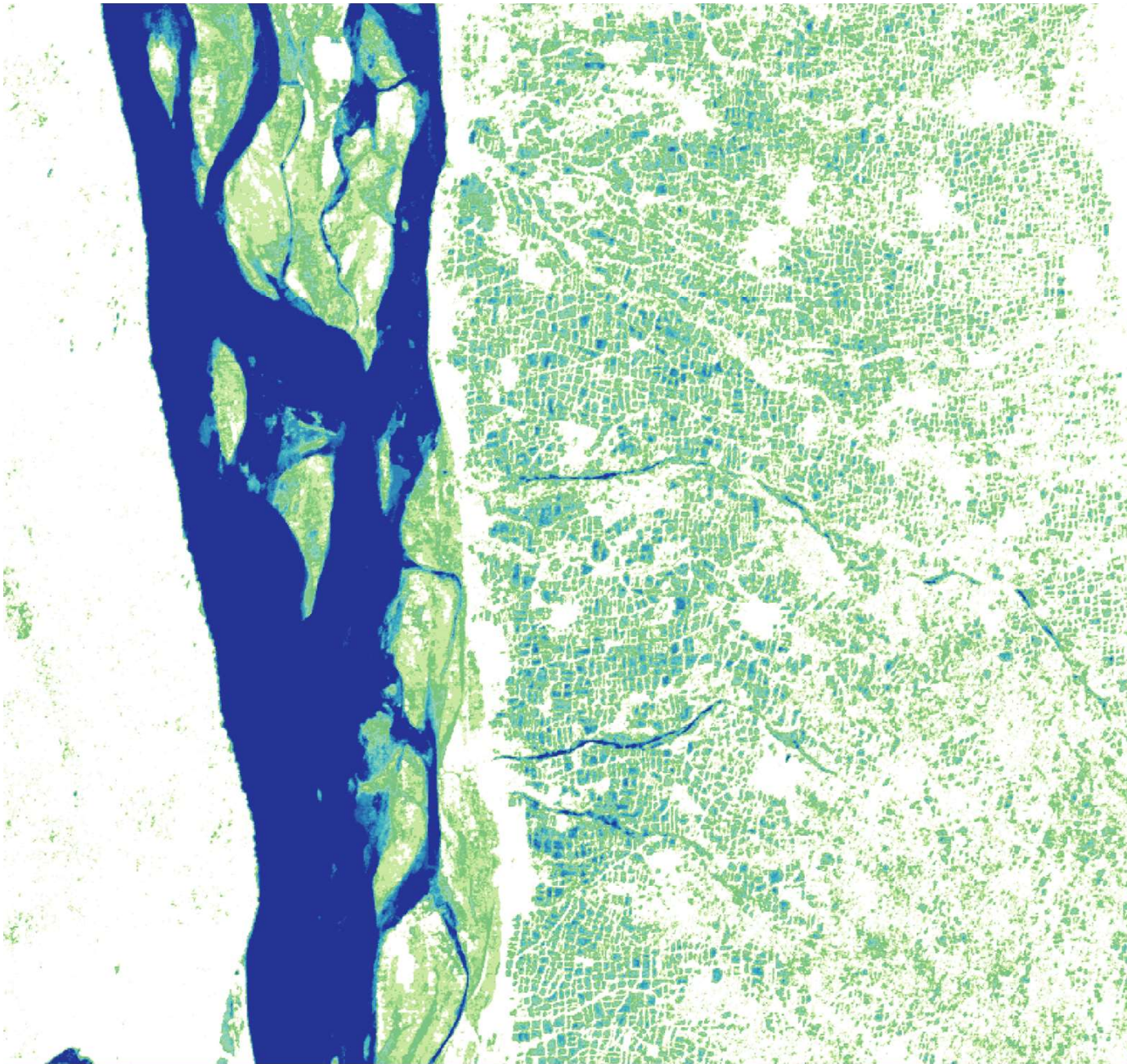
**aquaculture**

**Irregular  
patterns &  
shapes:  
smallholders**









## MYANMAR

**greens:** partly  
inundated

**irrigated  
agriculture**

**Irregular  
patterns &  
shapes:  
smallholders**









## MYANMAR

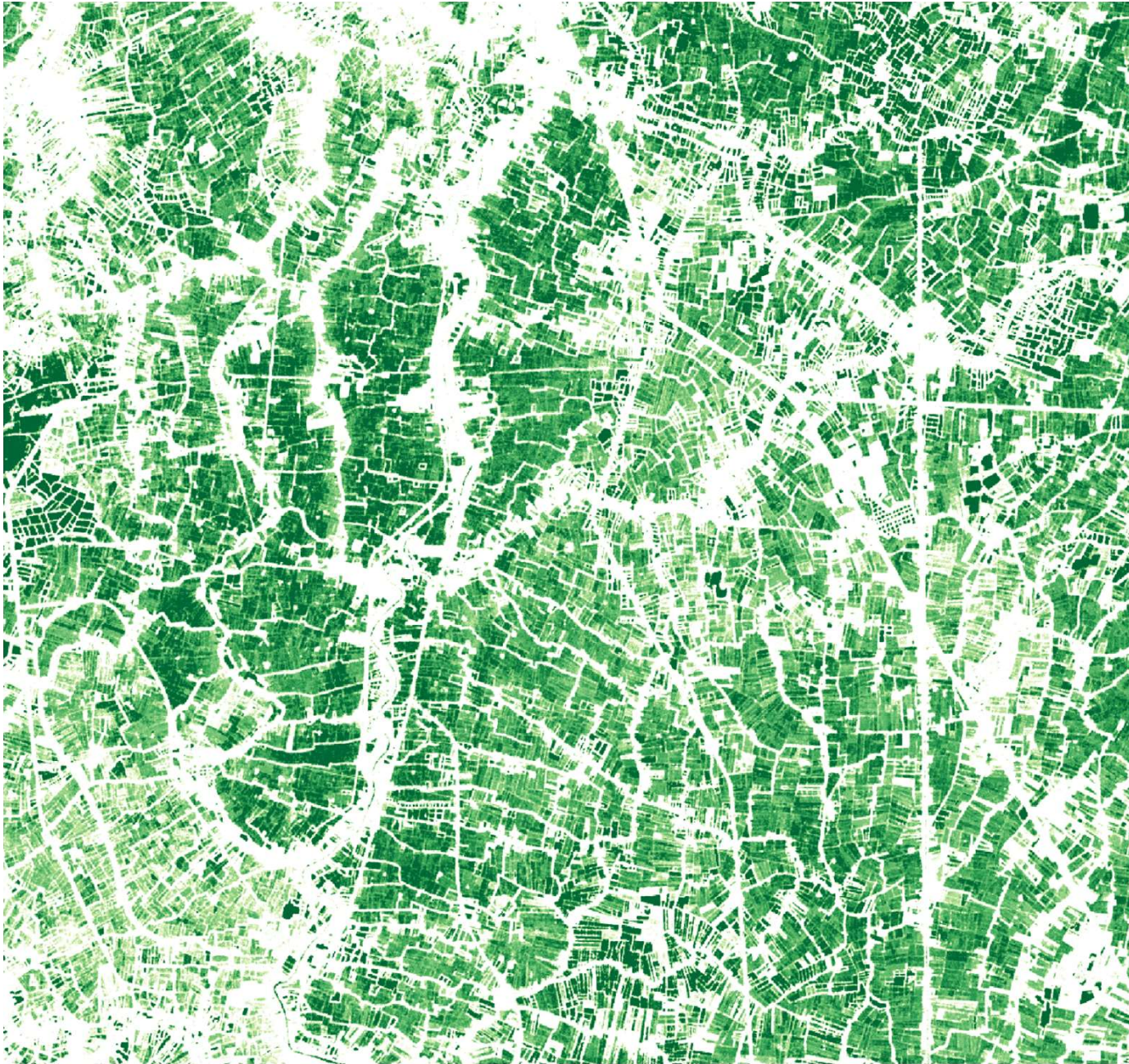
aquaculture &  
irrigated  
agriculture

regular patterns  
& shapes:  
planned  
agriculture









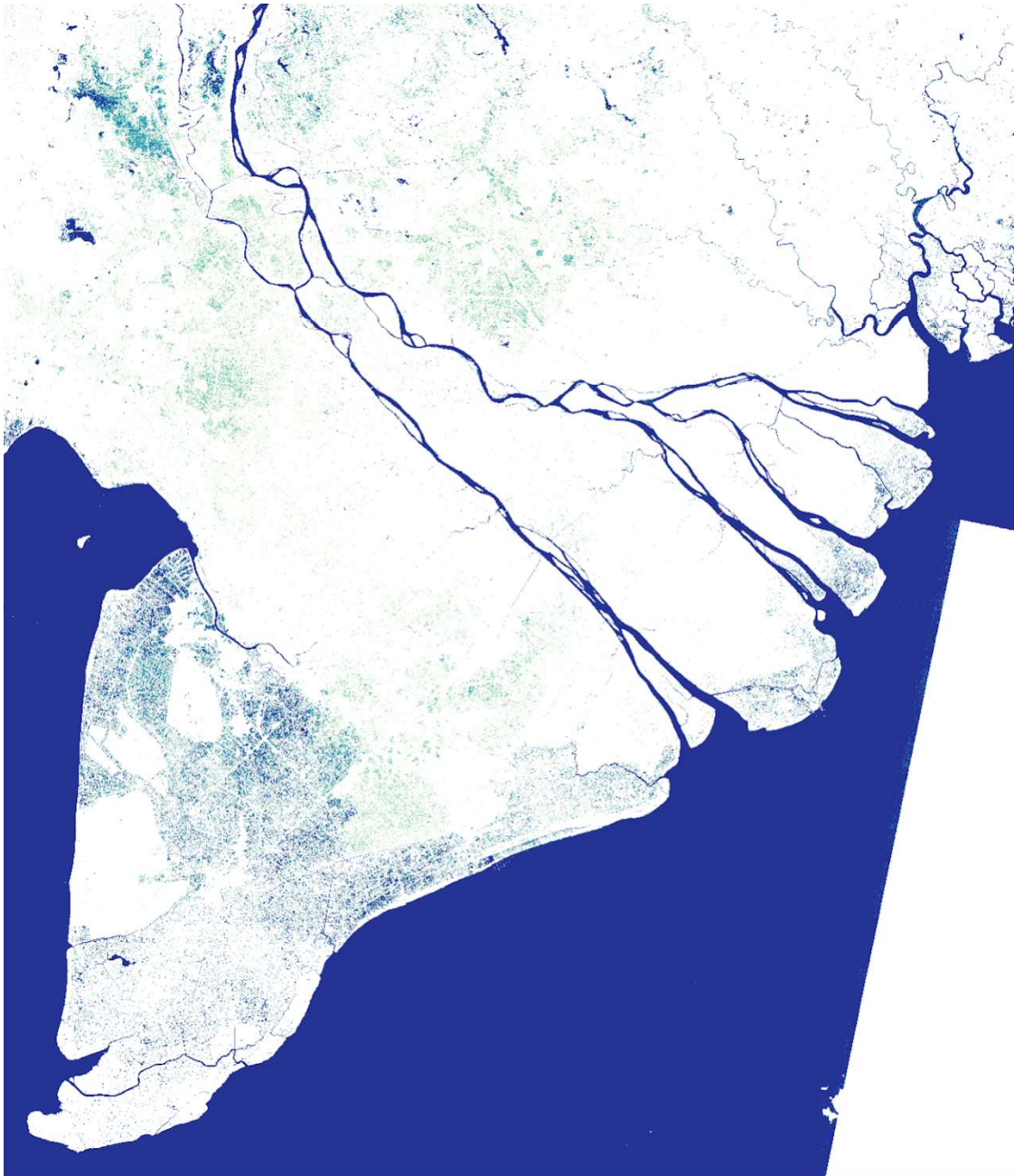
## THAILAND

**greens:**  
inundation  
frequency

**aquaculture &  
irrigated  
agriculture**

**semi-regular  
patterns &  
shapes: planned  
agriculture /  
smallholders**

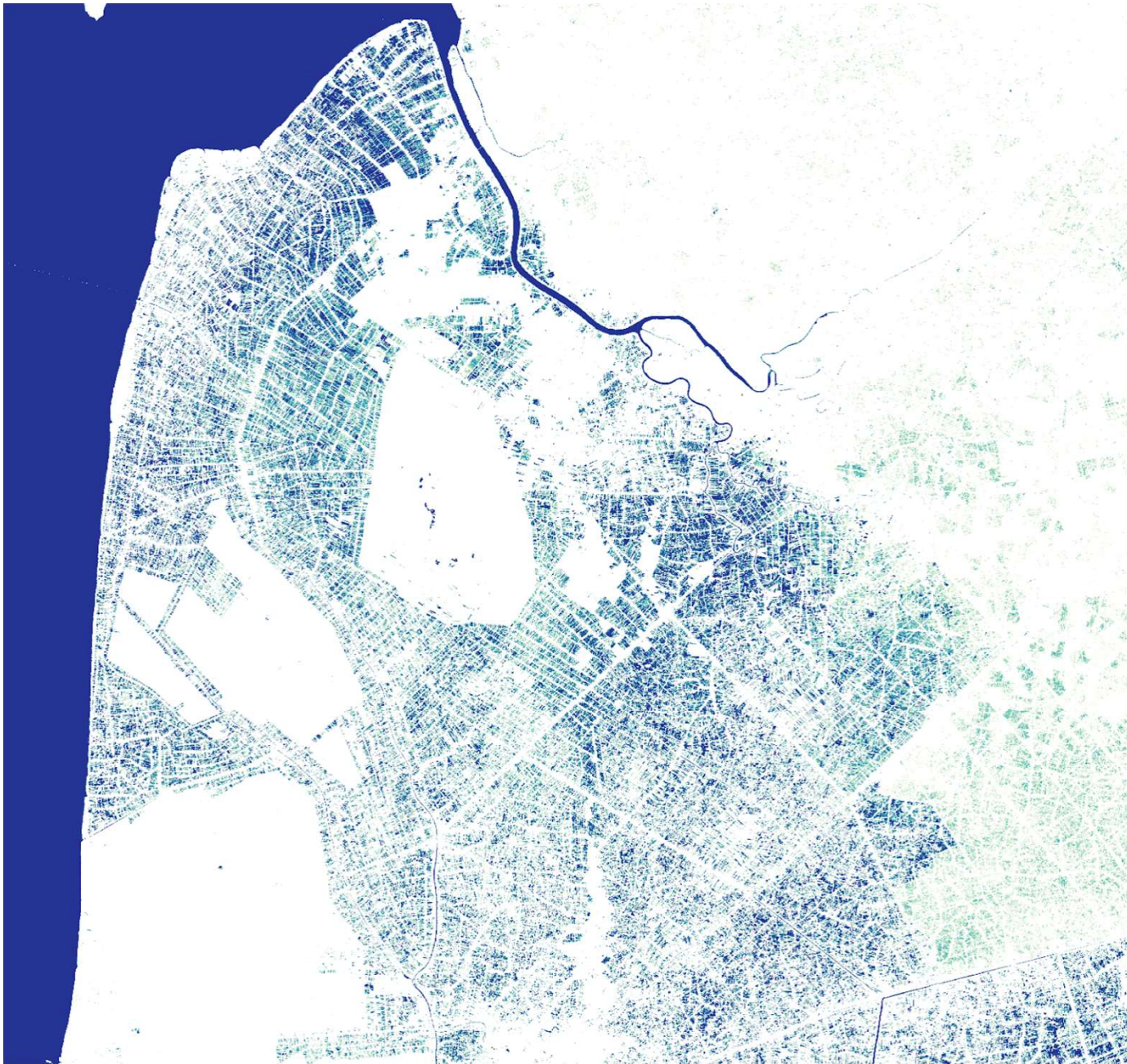




**VIETNAM**

**Mekong delta**





**VIETNAM**

**Mekong delta**





## VIETNAM

Mekong delta

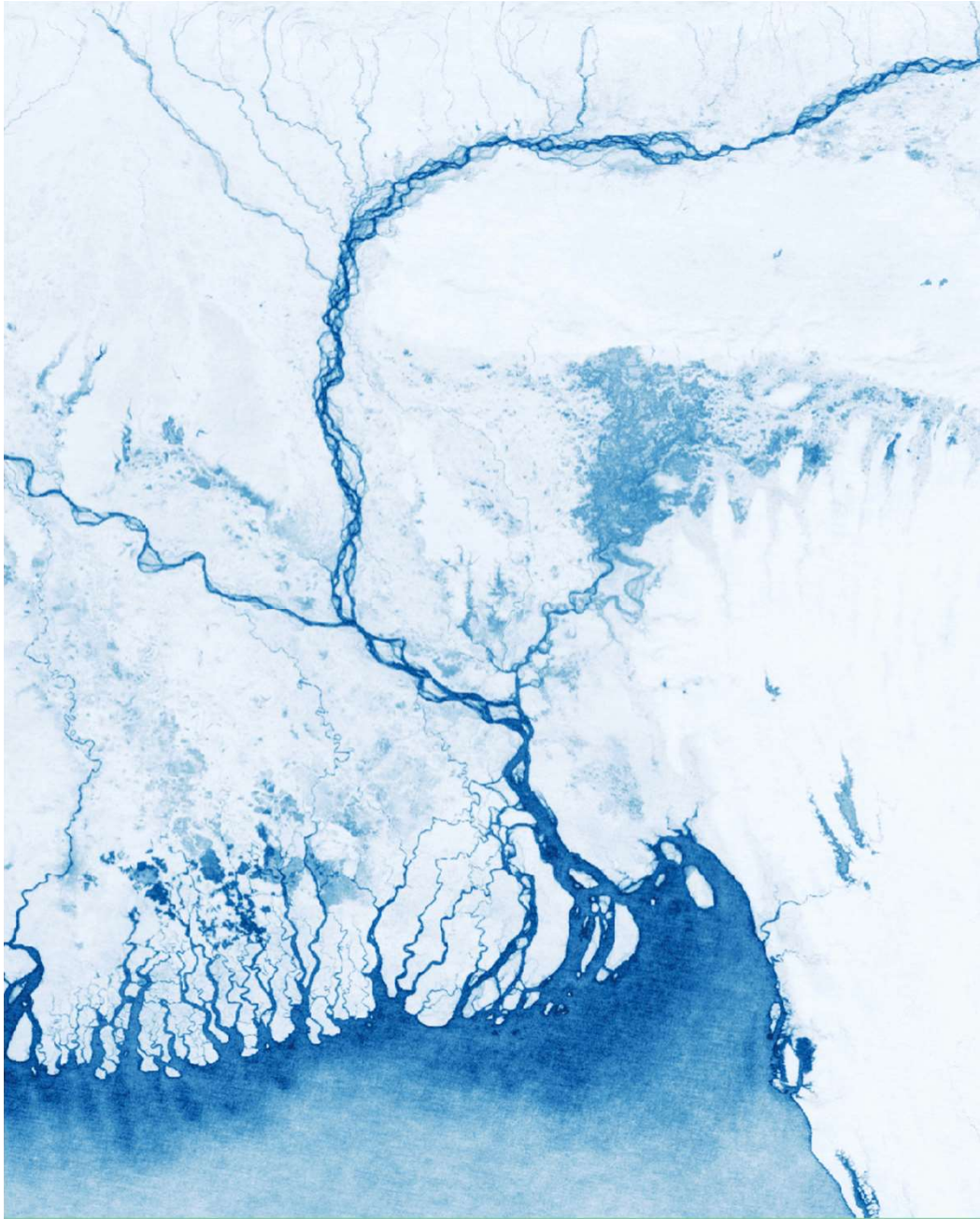
paddy rice

very regular  
patterns &  
shapes: **planned  
agriculture /  
coop**



# FLOODS

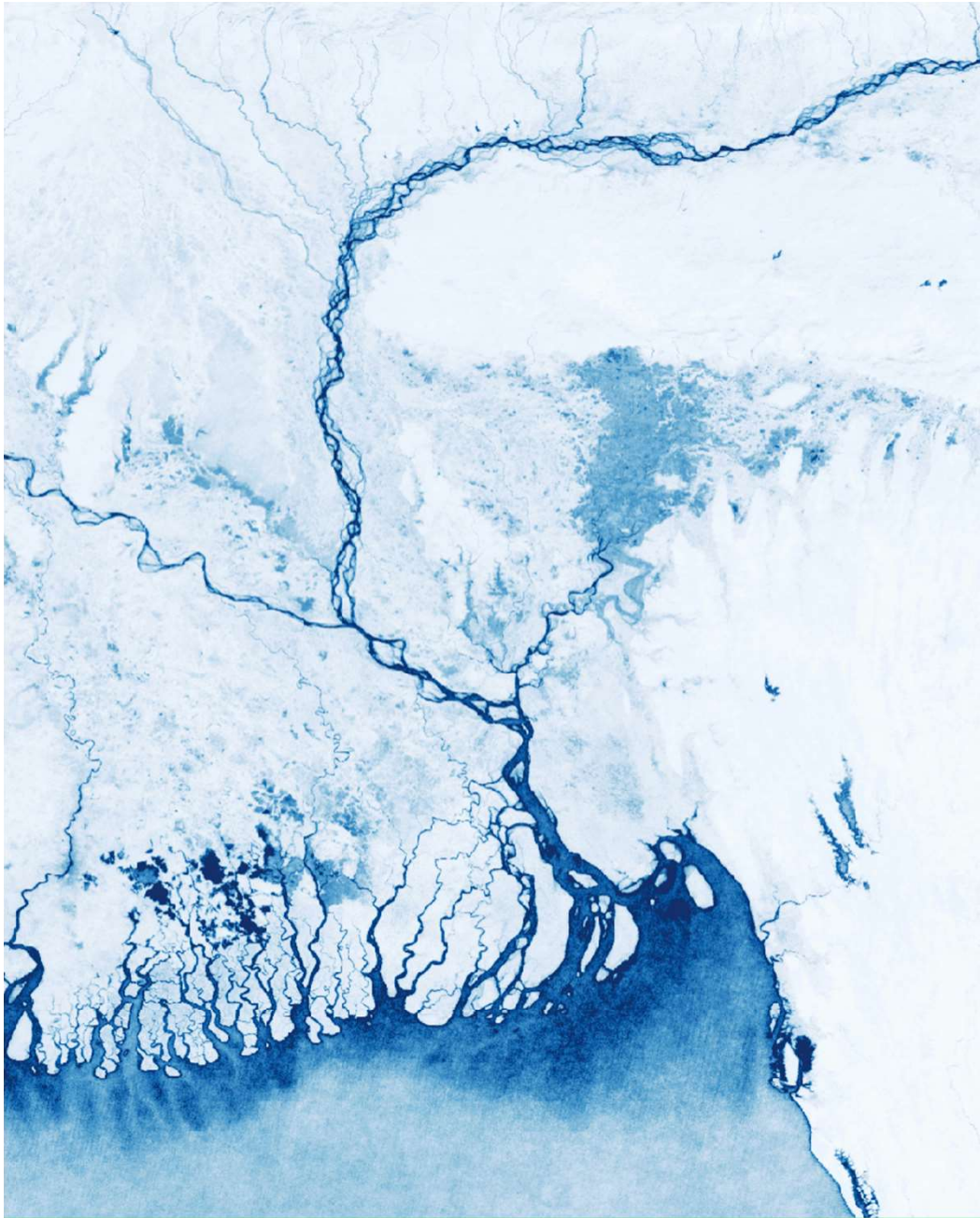
## Delta's Rivers



Bangladesh  
Inundation frequency

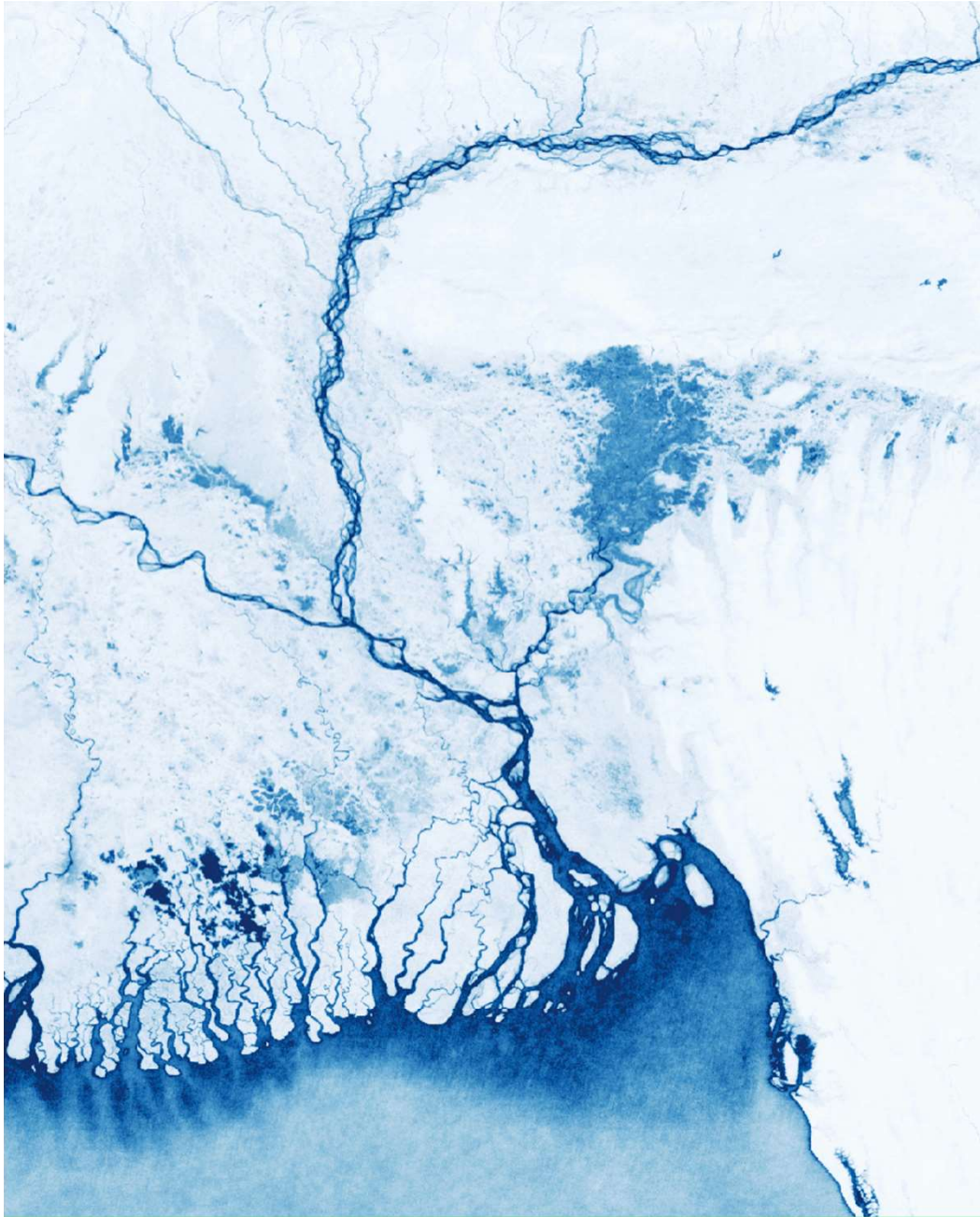
2000





Bangladesh  
Inundation frequency

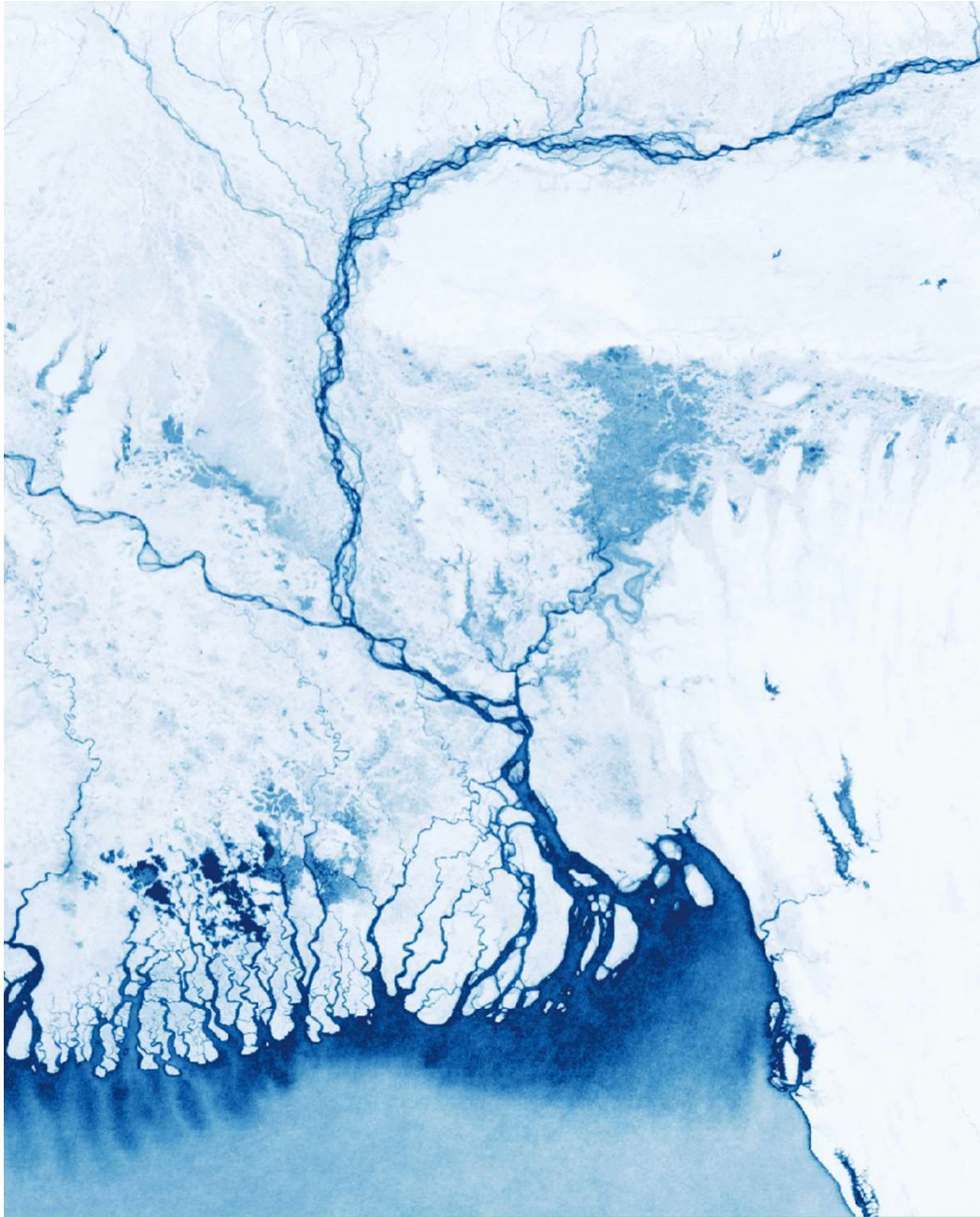
2001



Bangladesh  
Inundation frequency

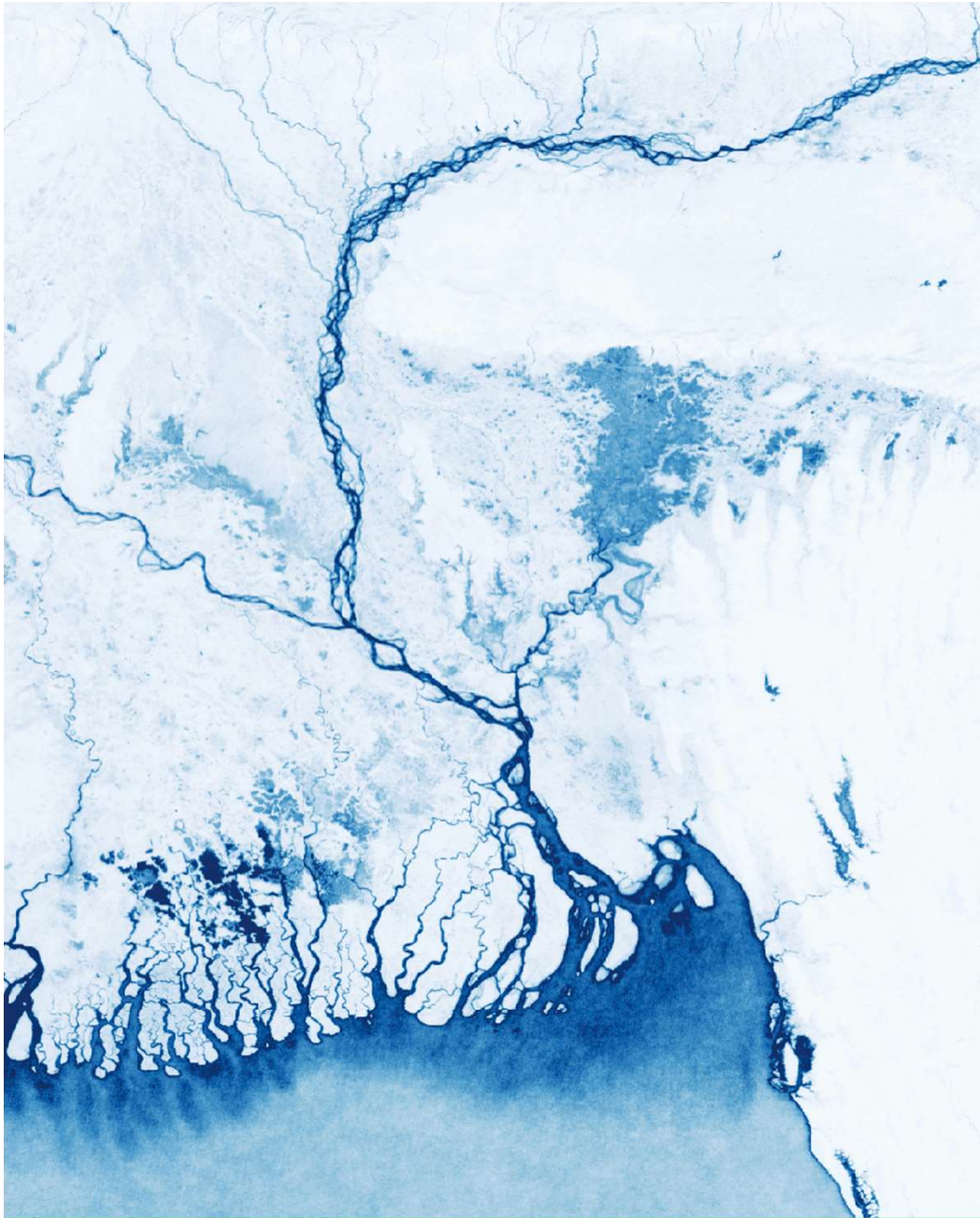
2002





Bangladesh  
Inundation frequency

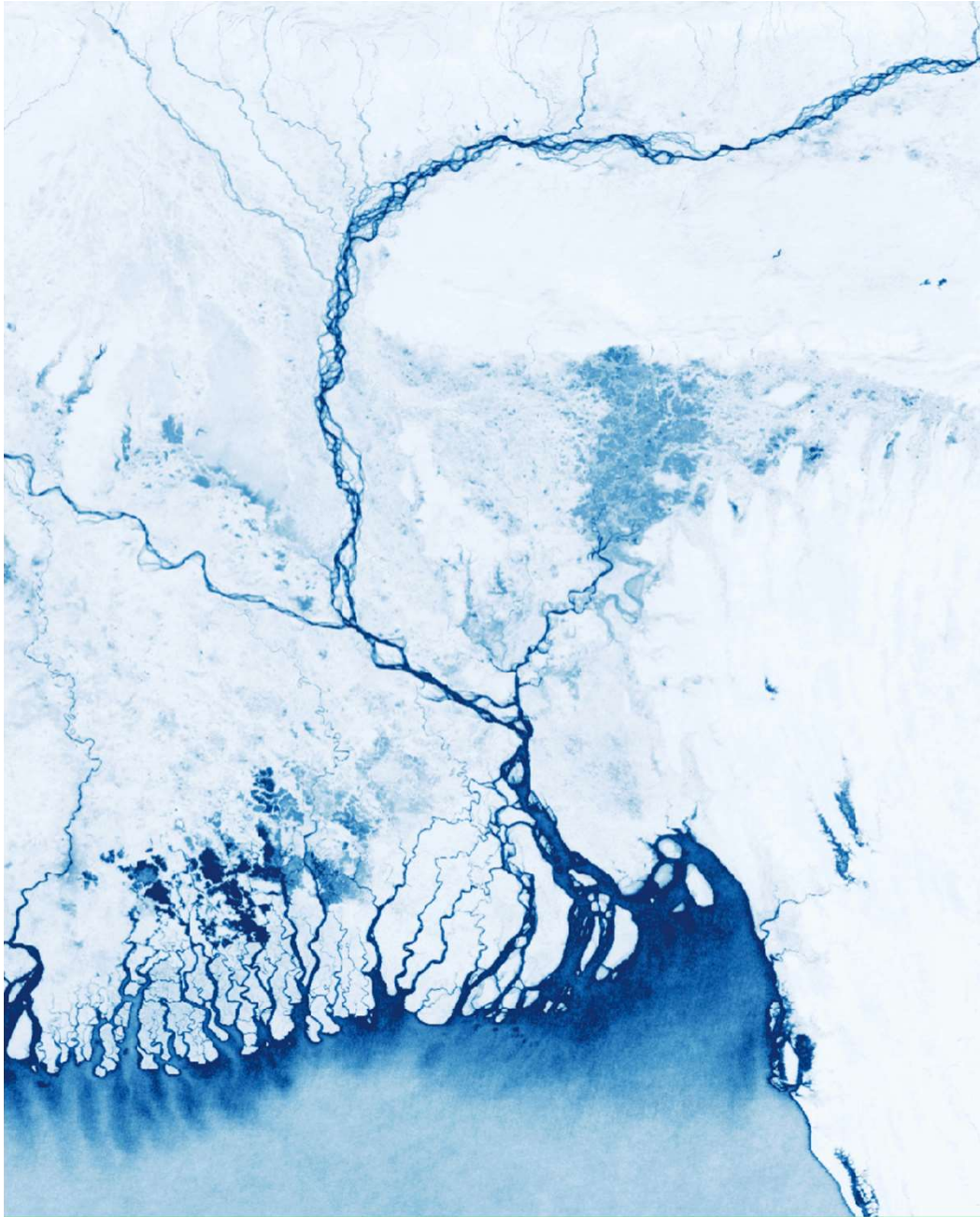
2003



Bangladesh  
Inundation frequency

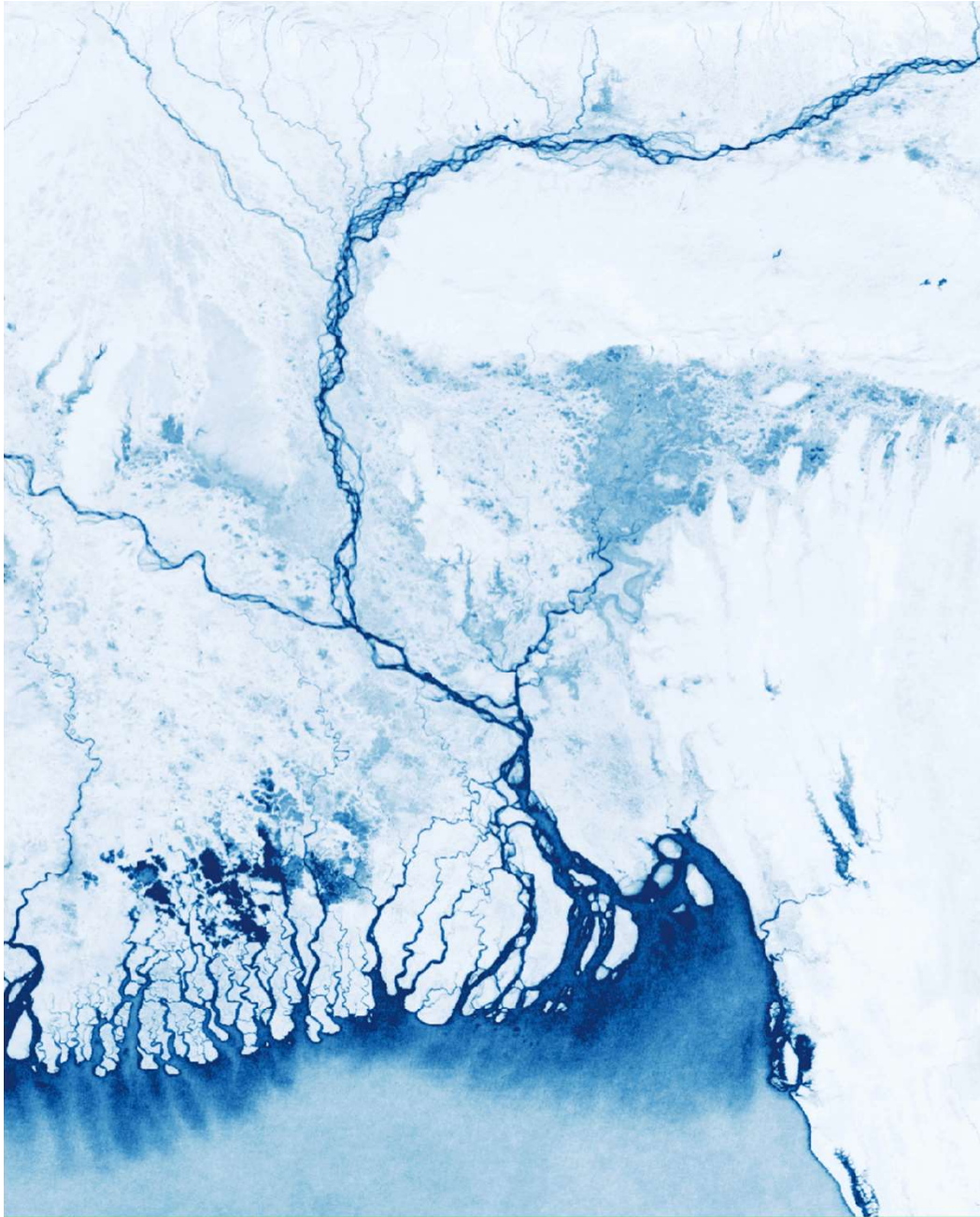
2005





Bangladesh  
Inundation frequency

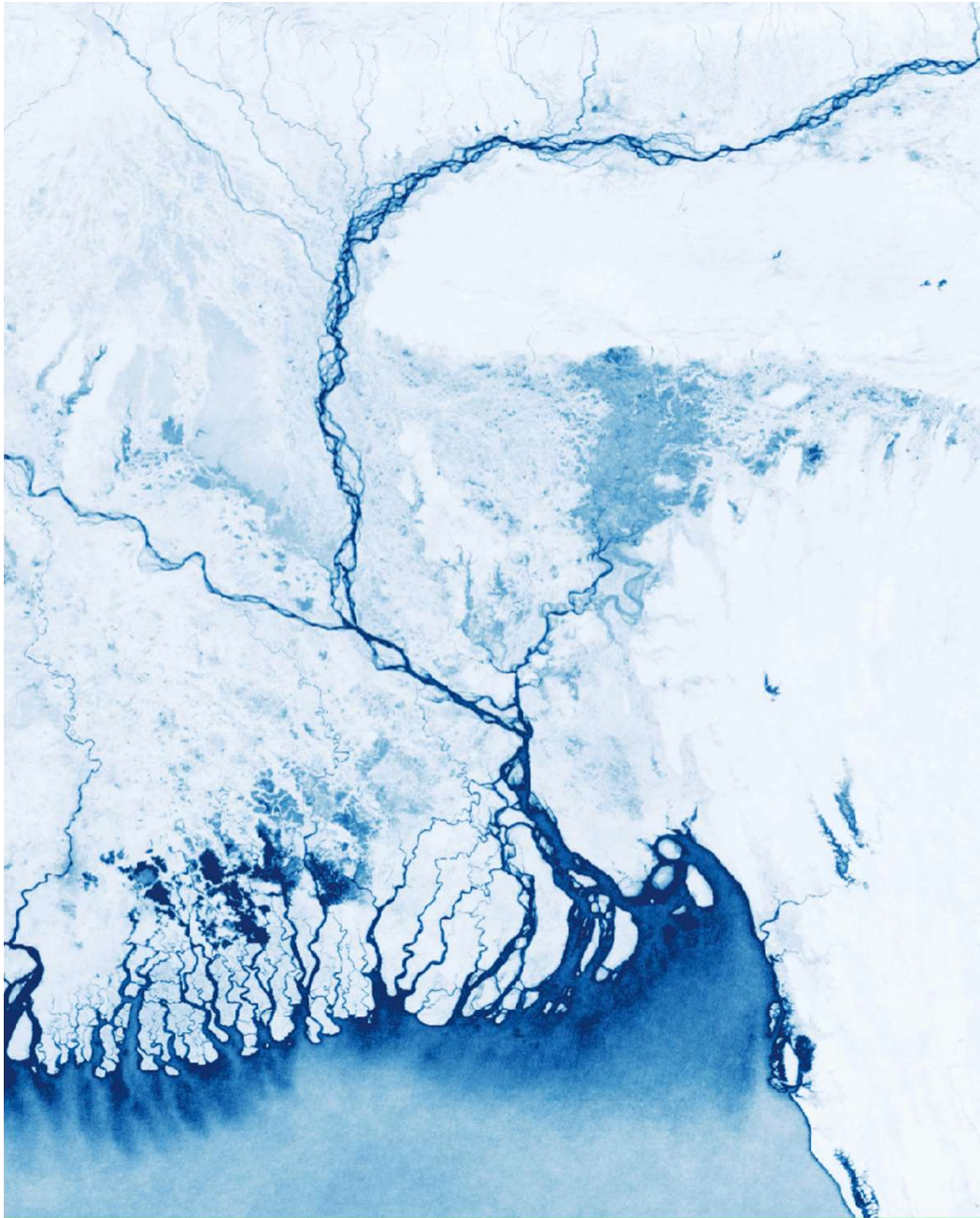
2006



Bangladesh  
Inundation frequency

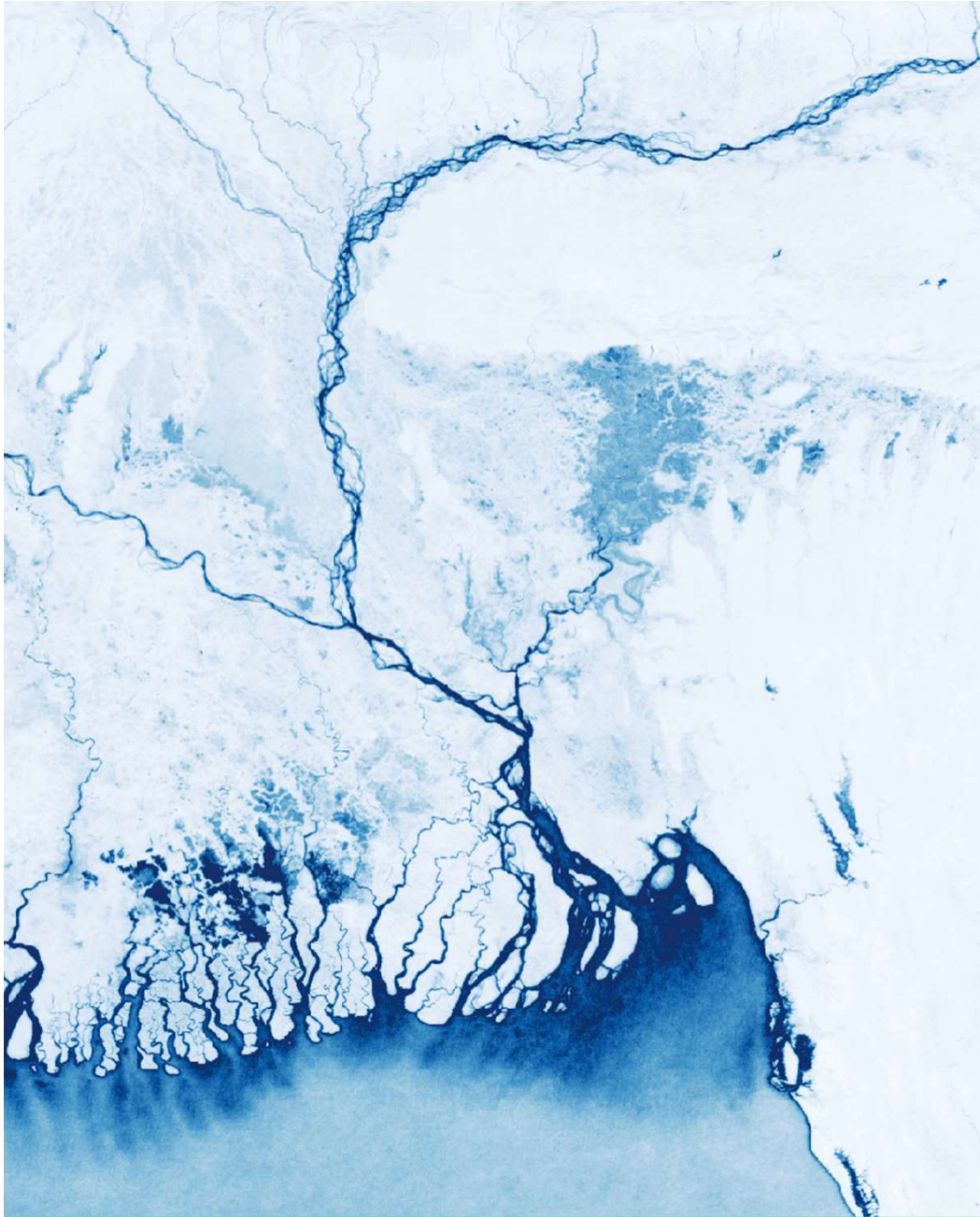
2007





Bangladesh  
Inundation frequency

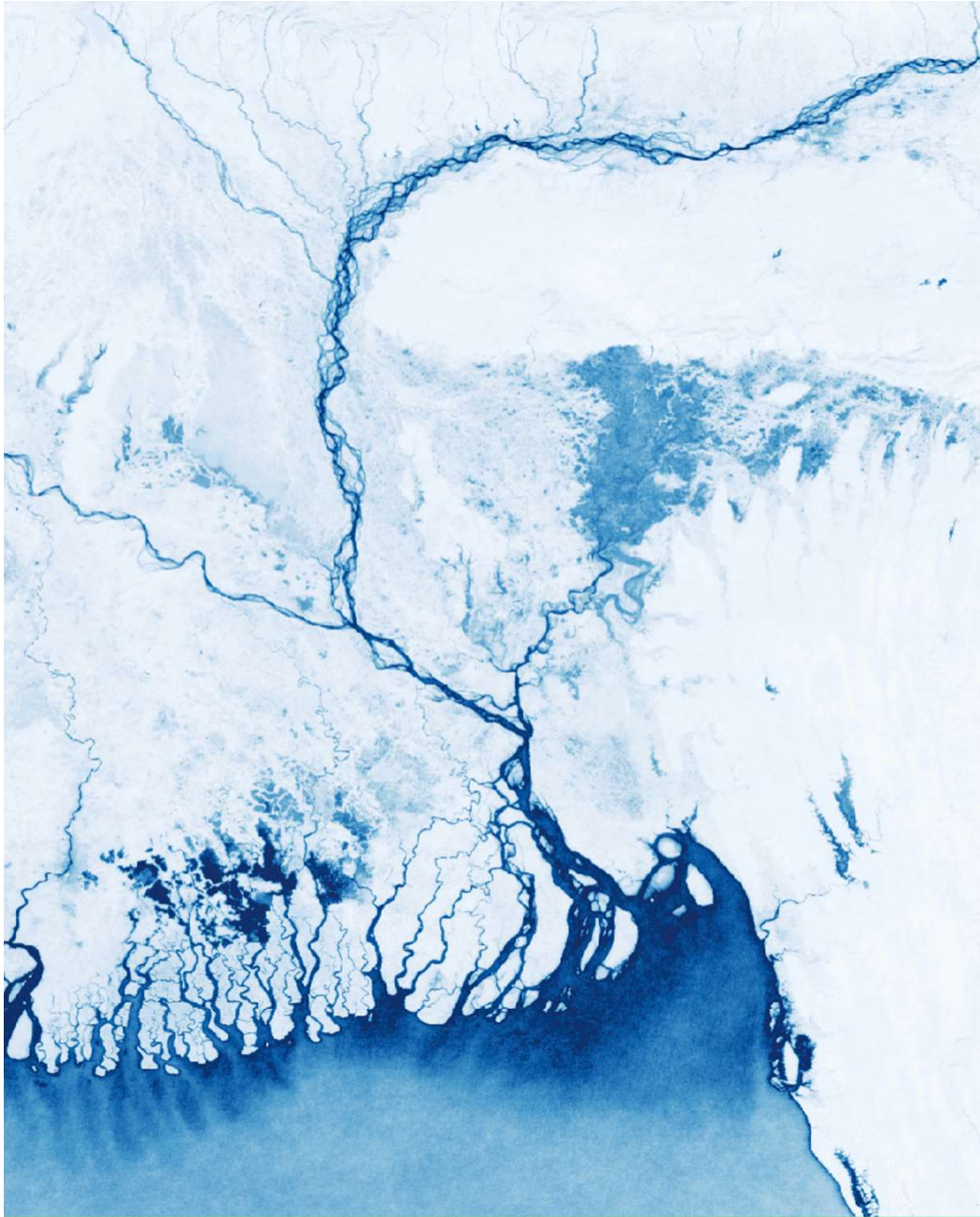
2008



Bangladesh  
Inundation frequency

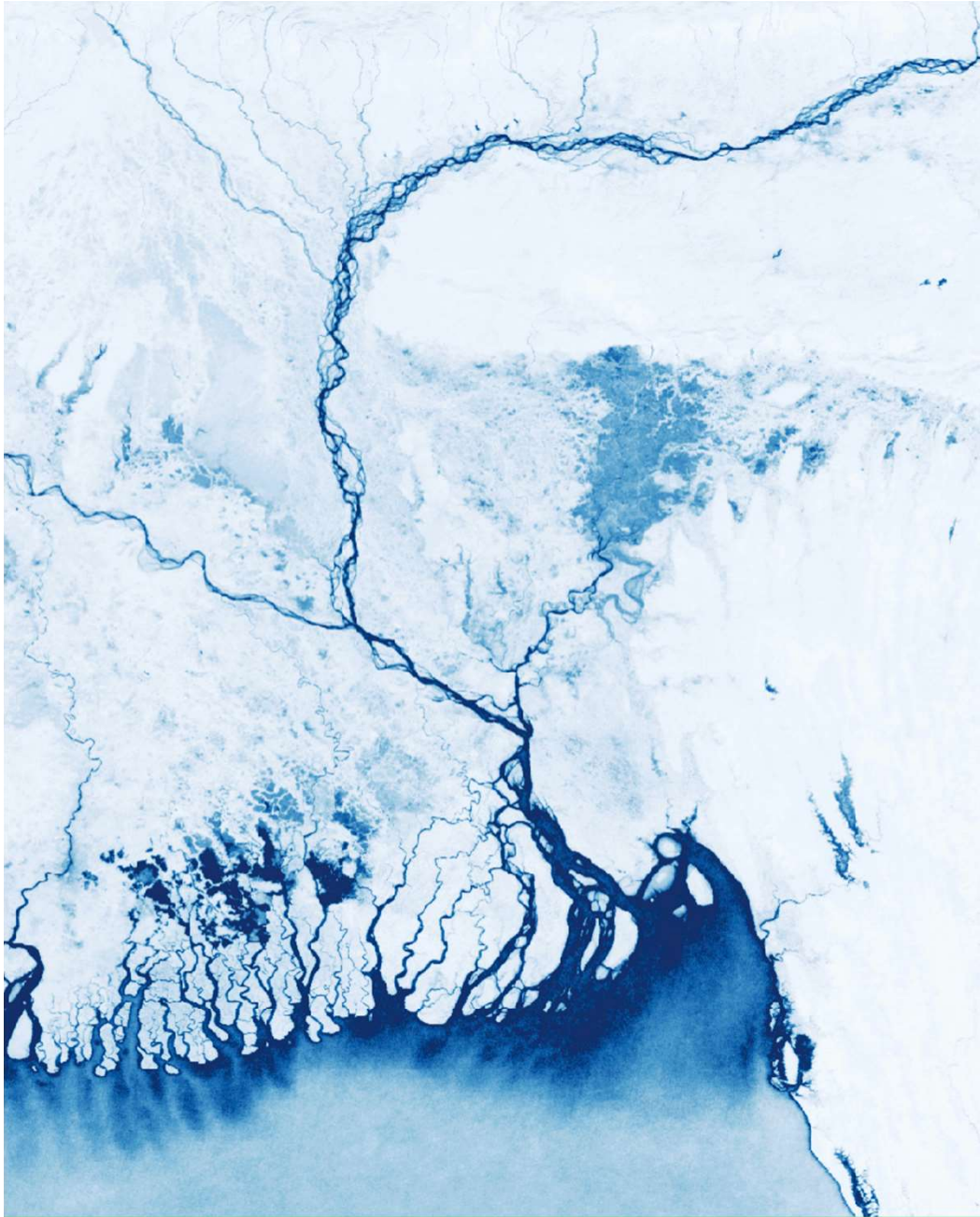
2009





Bangladesh  
Inundation frequency

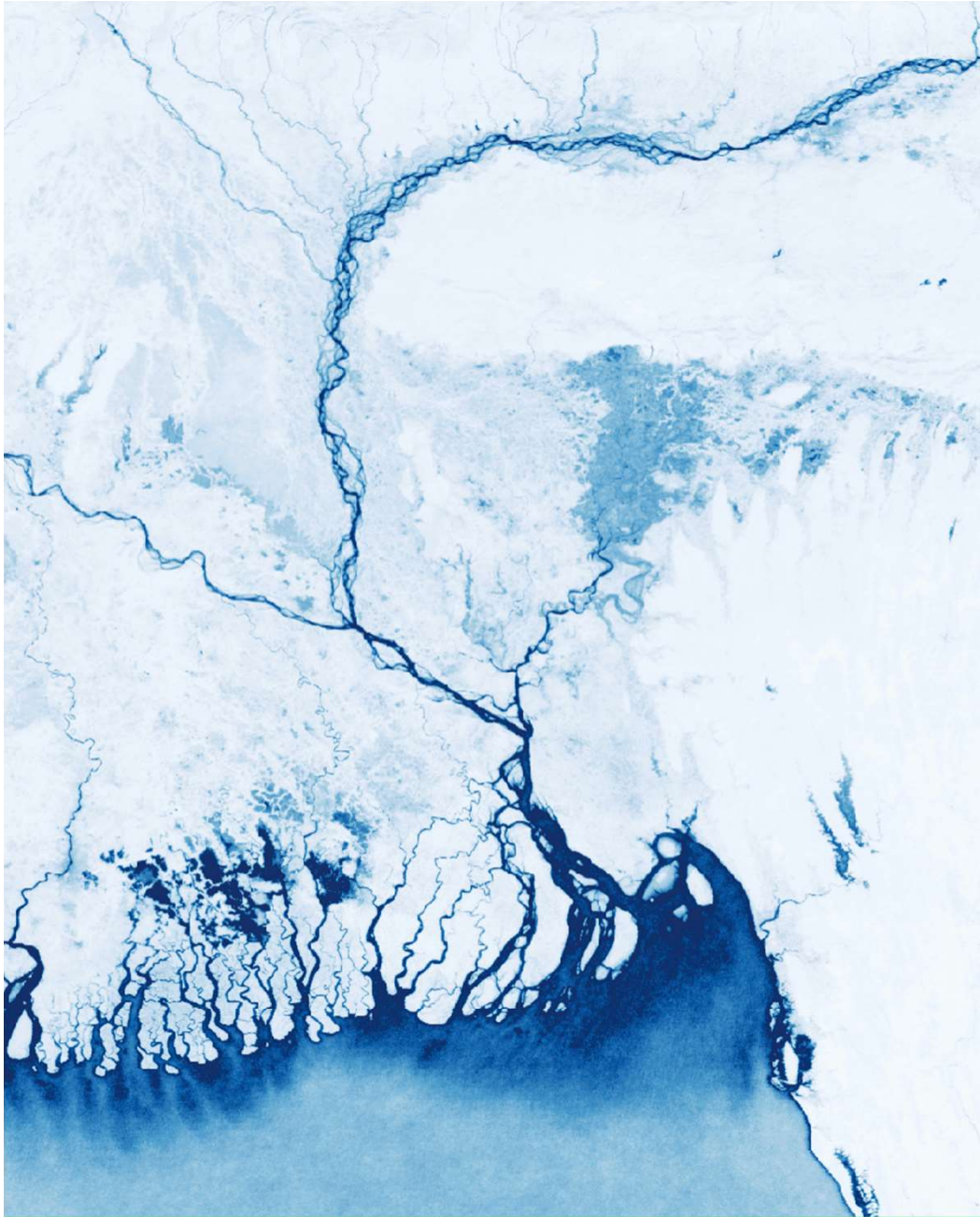
2010



Bangladesh  
Inundation frequency

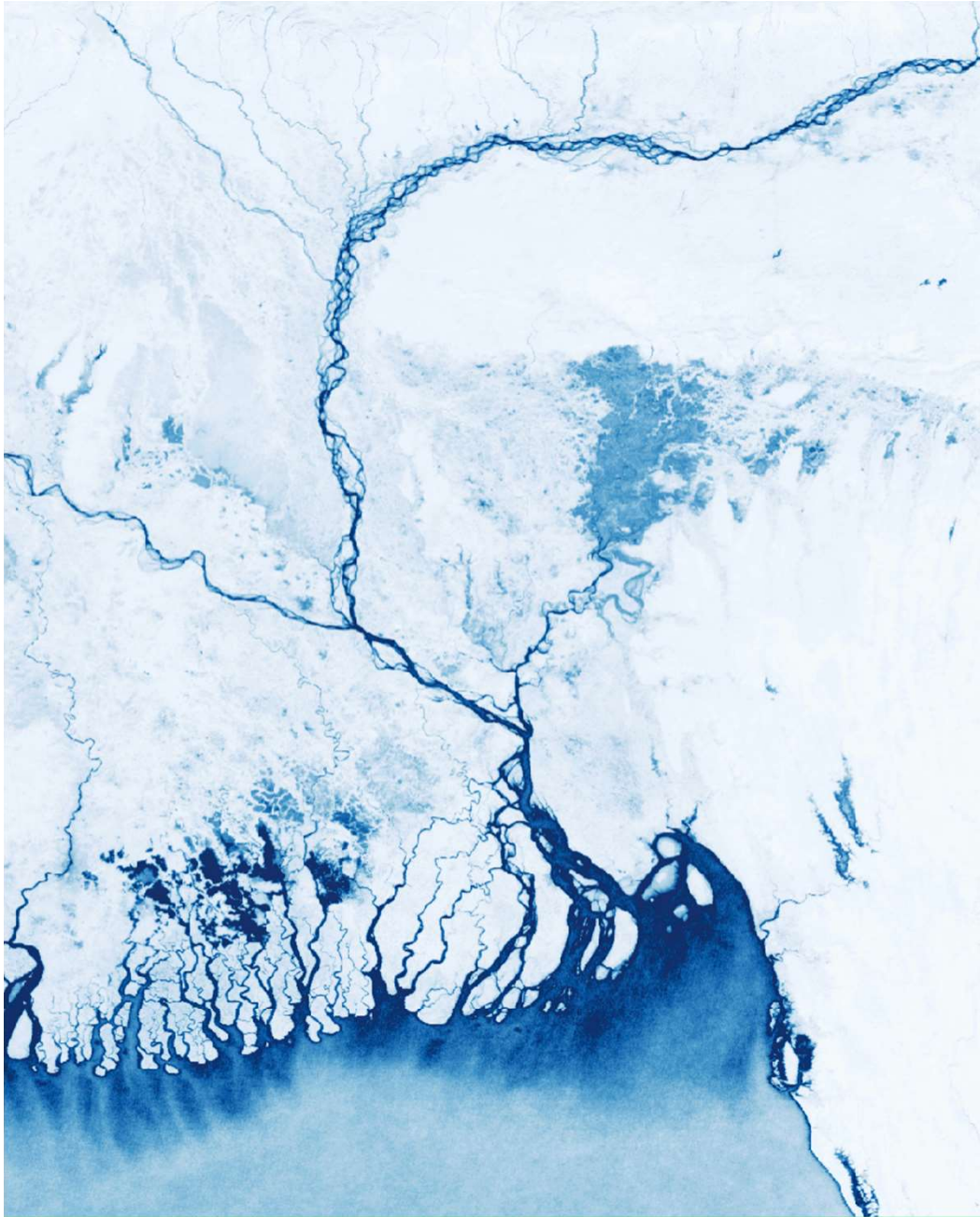
2011





Bangladesh  
Inundation frequency

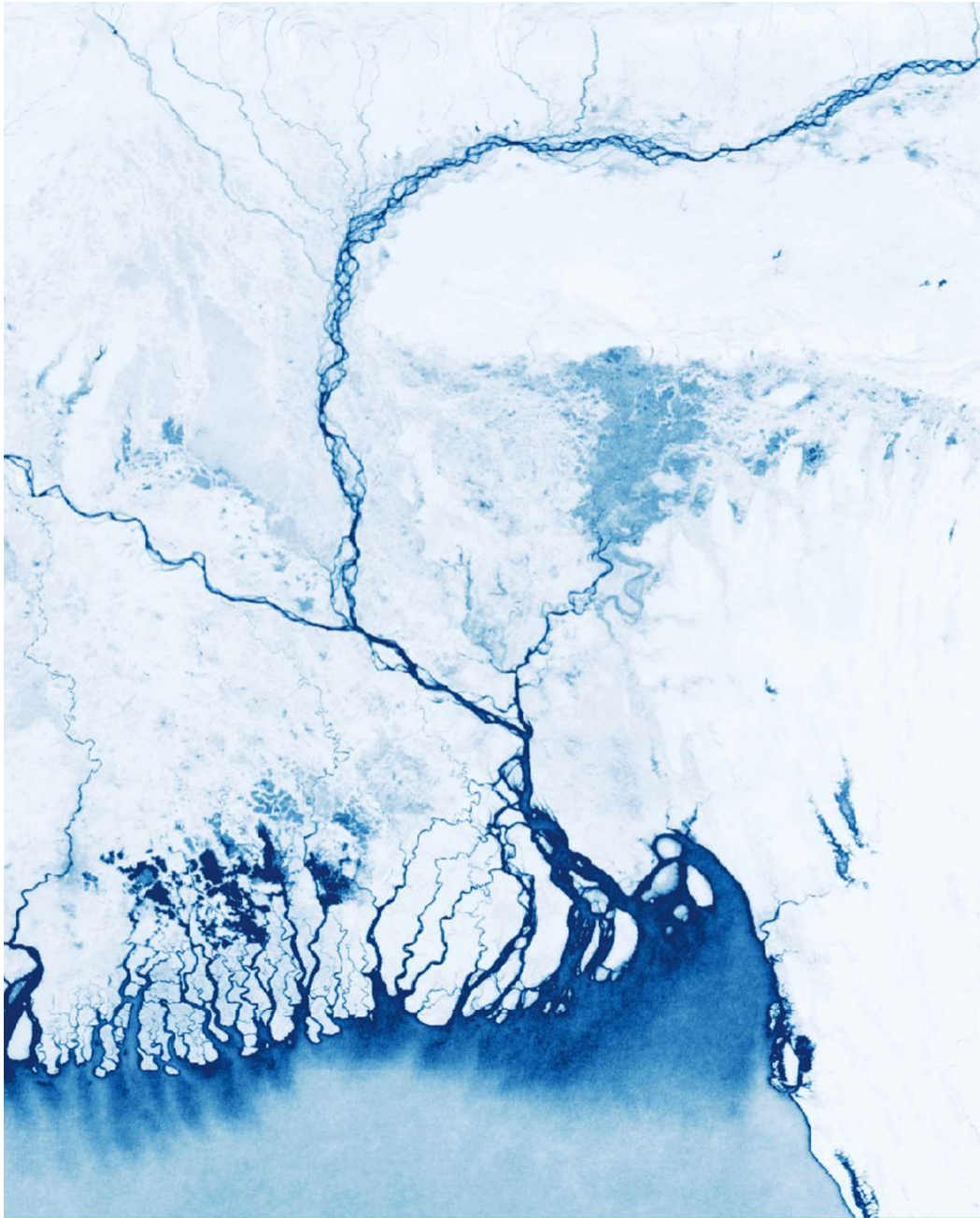
2012



Bangladesh  
Inundation frequency

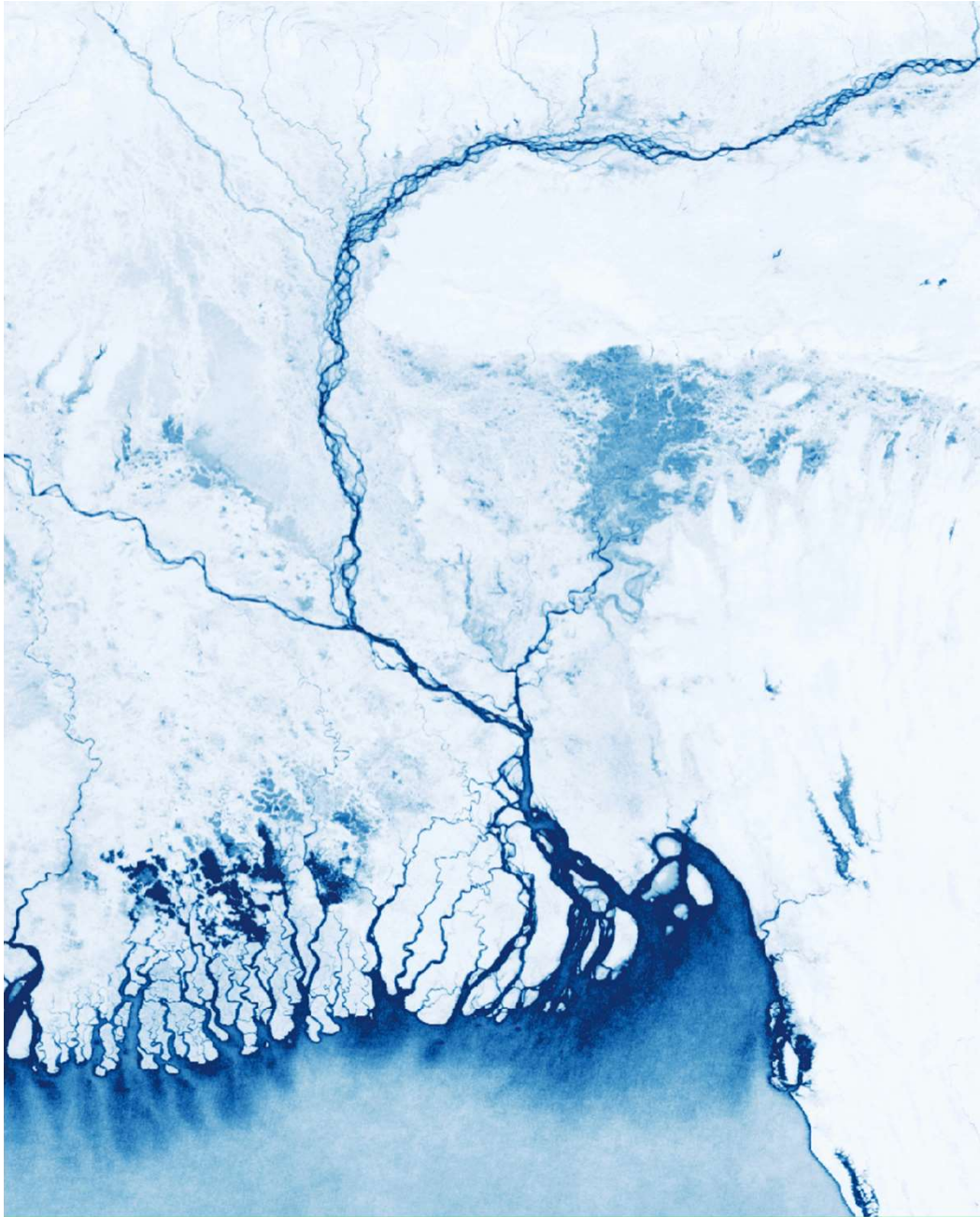
2013





Bangladesh  
Inundation frequency

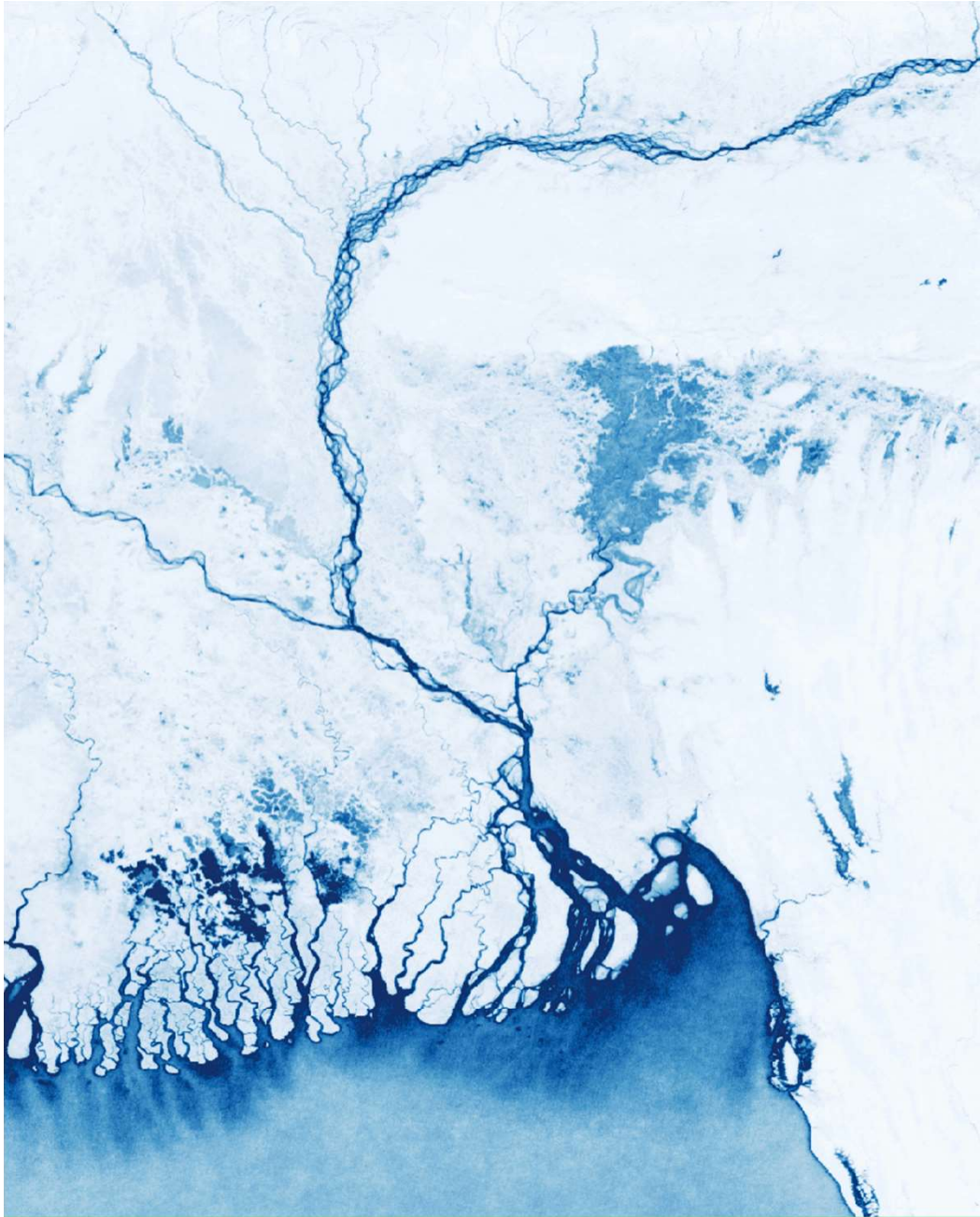
2014



Bangladesh  
Inundation frequency

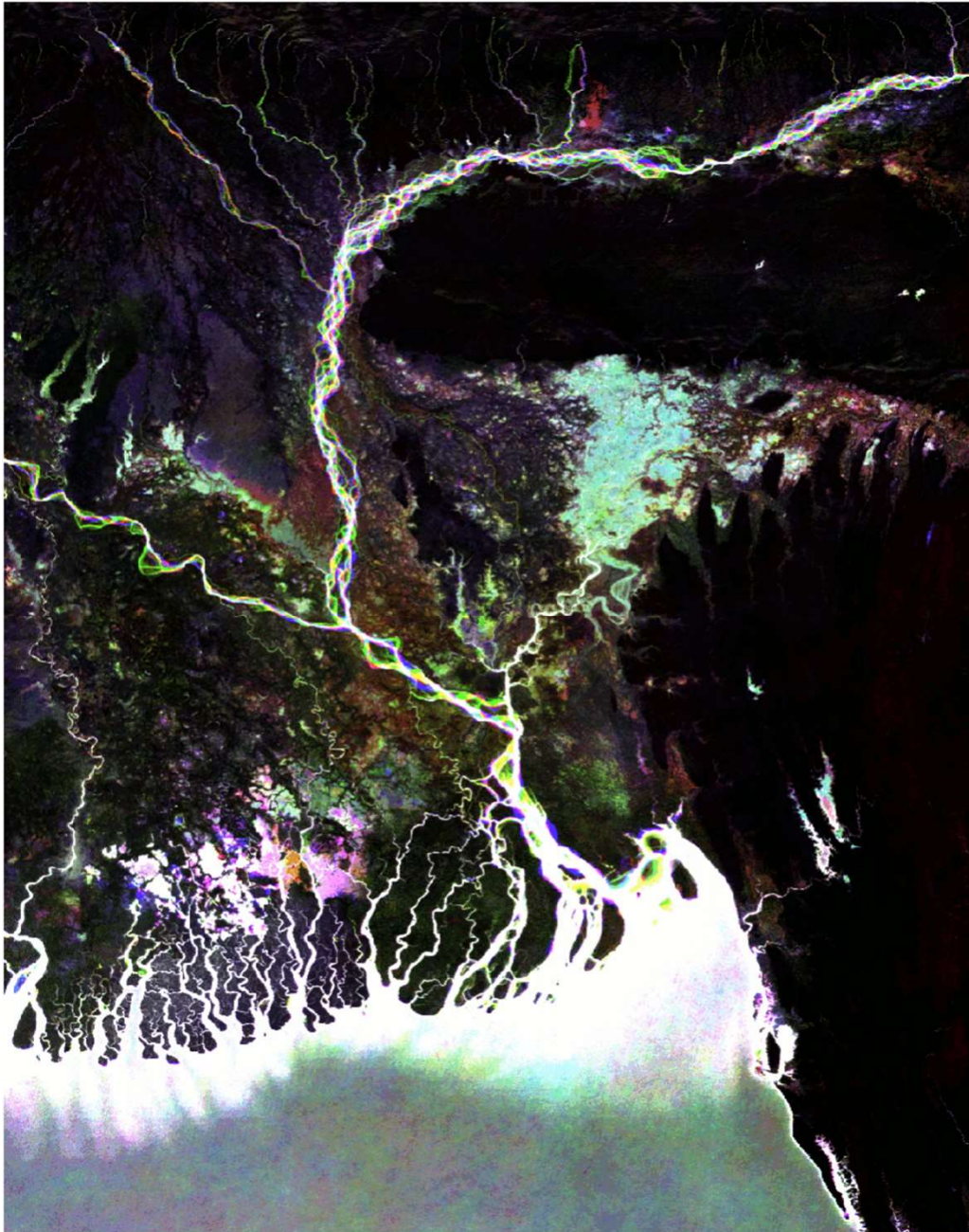
2015





Bangladesh  
Inundation frequency

2016



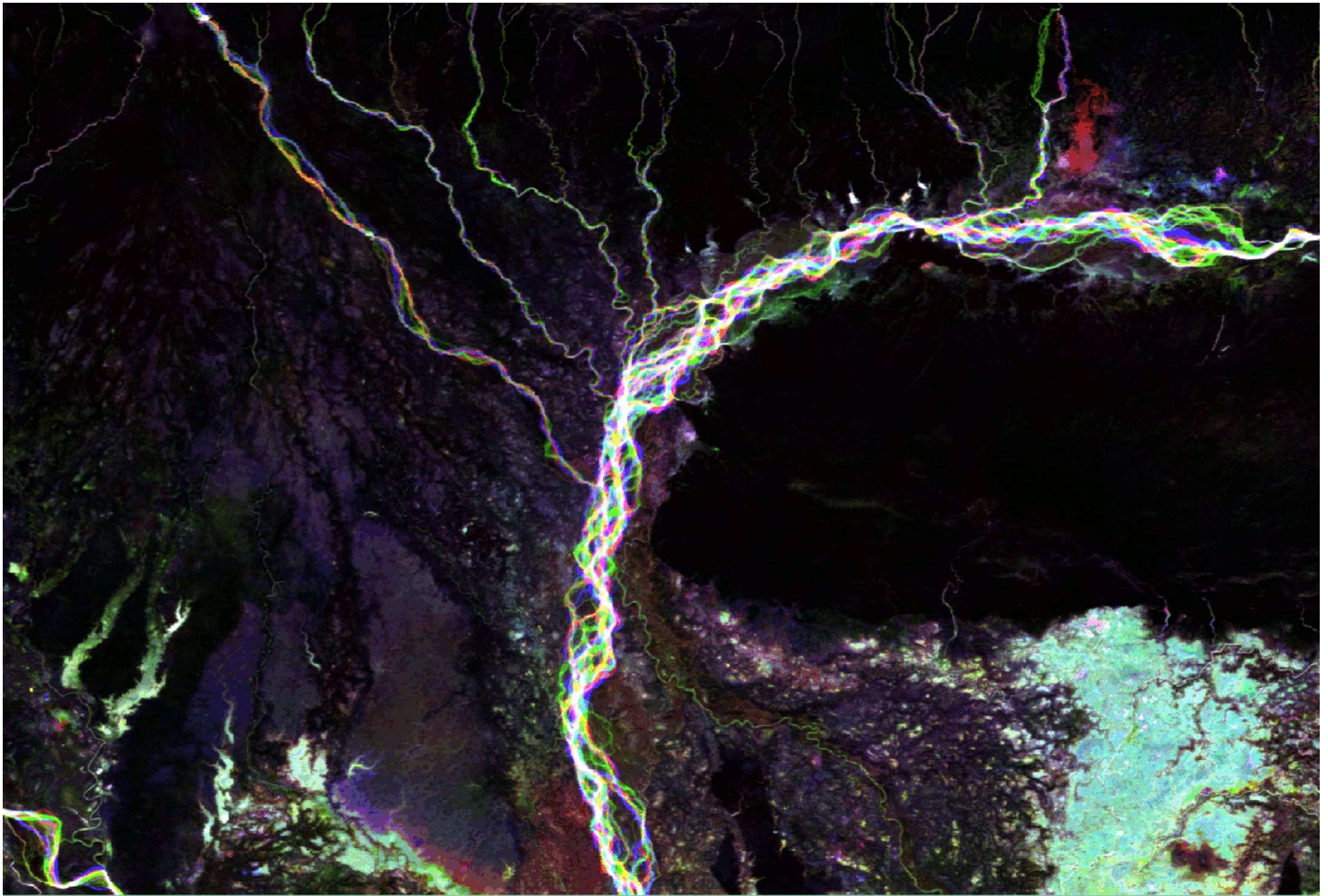
Bangladesh  
Inundation frequency

R 2000

G 2008

B 2016





# EO4SD engages with 2 ADB projects in Cambodia



Asian Development Bank

## **Tonle Sap Poverty Reduction and Smallholder Development Project (TSSD)**

TSSD has been funded by ADB and IFAD. It focuses on improving rural infrastructure, agricultural productivity and monitoring of crop production (expanding from rice crops/yields to other main crops, expansion of irrigation canals, and access to markets). The Cambodian Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of the Interior (NCDSS) are the implementing organisations. Phase I of the TSSD project has been finalised and phase II will be implemented from April 2018 to 2022.



Asian Development Bank

## **Strengthening Coordination for Management of Disasters Project (SCMD)**

SCMD focuses on disaster risk reduction (mainly floods, droughts), both at national and communal/local level. This project is implemented by the National Committee for Disaster Management (NCDM).



Asian Development Bank

## **CLIMATE-RESILIENT RICE COMMERCIALIZATION SECTOR DEVELOPMENT PROGRAM (RICE SDP).**

RICE SDP is complementary to TSSD in 3 provinces, and covers the same area of interest in those. The set-up of the program is still in an early stage and they see great benefits for the EO4SD services.

## **Common local stakeholders**

- Ministry of Agriculture, Forestry and Fisheries
- Ministry of Interior
- National Committee of Disaster Management
- Ministry of Water Resources and Management

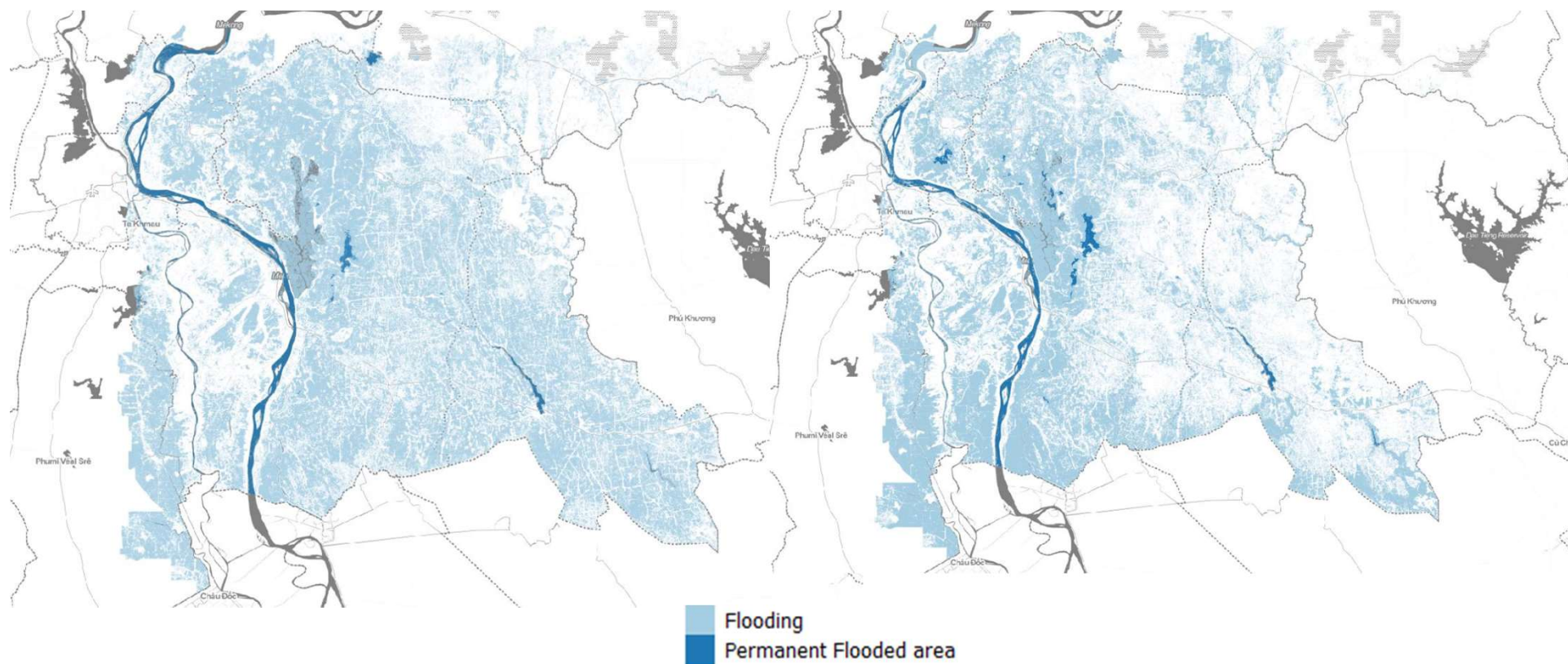


## AREAS OF INTEREST



2015/2016 Winter Spring season

2016/2017 Winter Spring season



AW: June to February  
WS: October to May  
SA: March to October

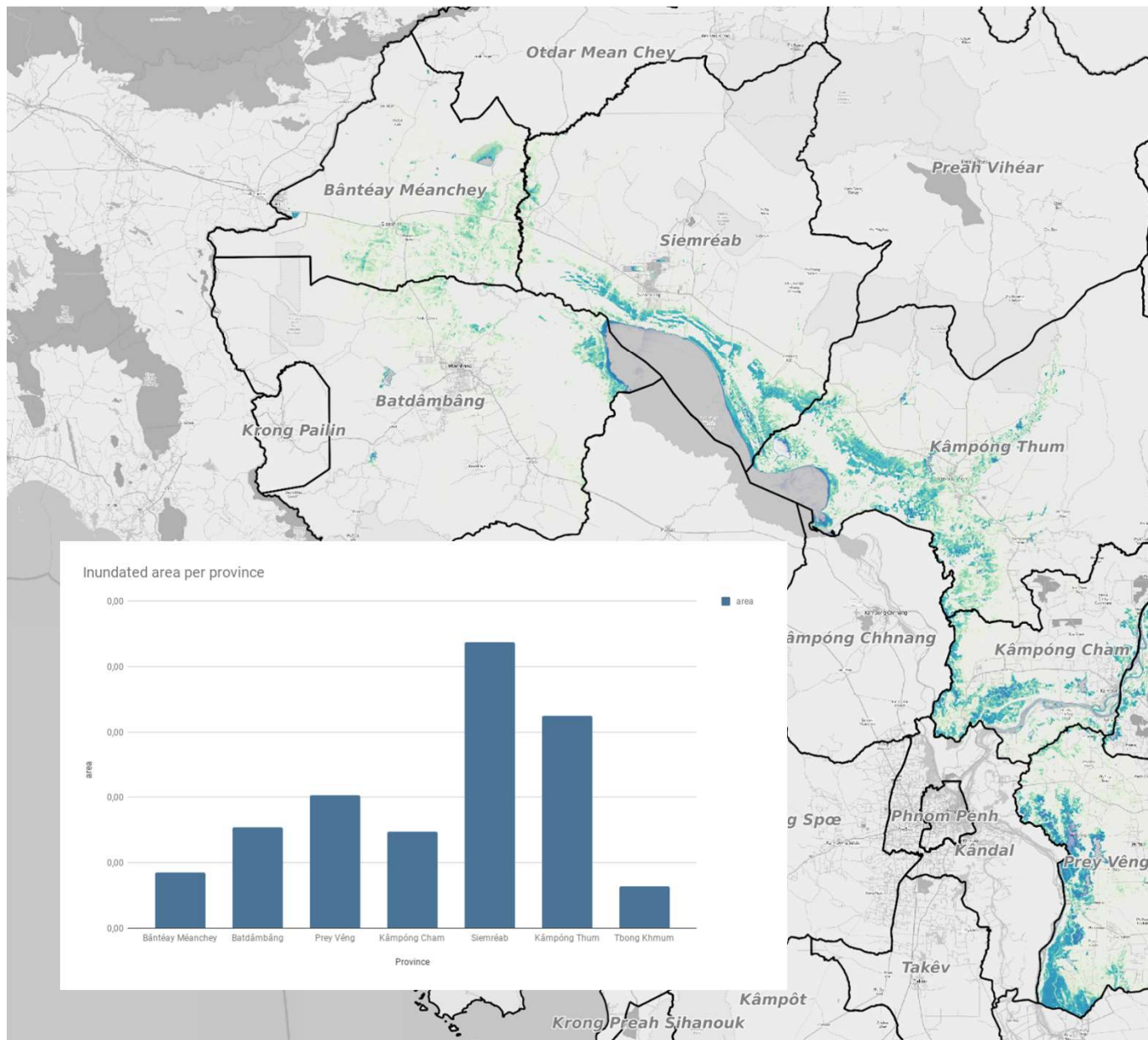
Commune	Hectares flooded WS 2016	% flooded WS 2016	Hectares flooded WS 2017	% flooded WS 2017
Svay Chrum	6022	71	939	11
Angkor Angk	2097	60	3000	86

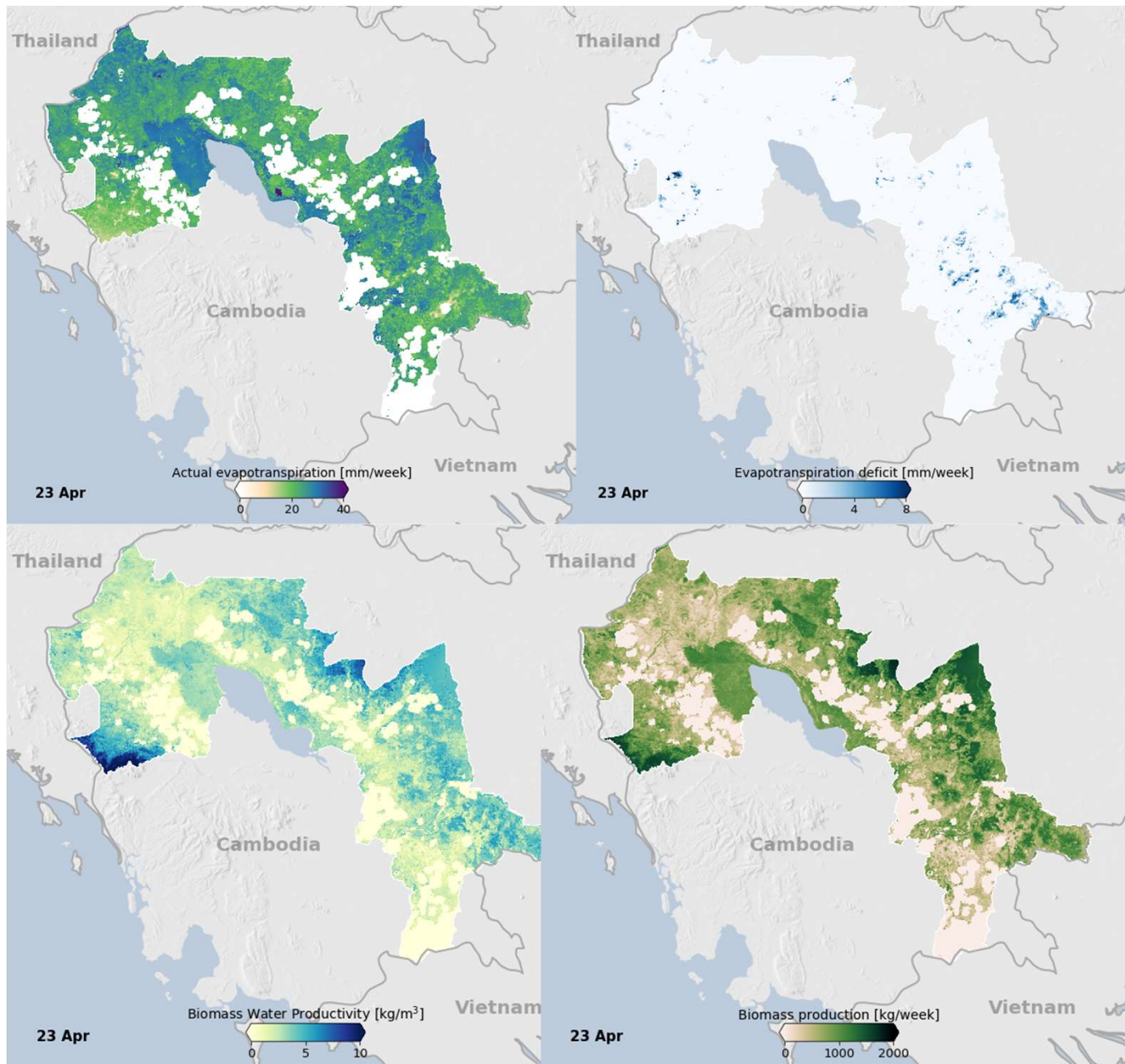
In 88 communes (of 116) of Prey Veng more area was affected by flooding in 2016 than in 2017



## EO4SD INSIGHTS

Seasonal  
inundation  
frequency





## EO4SD INSIGHTS

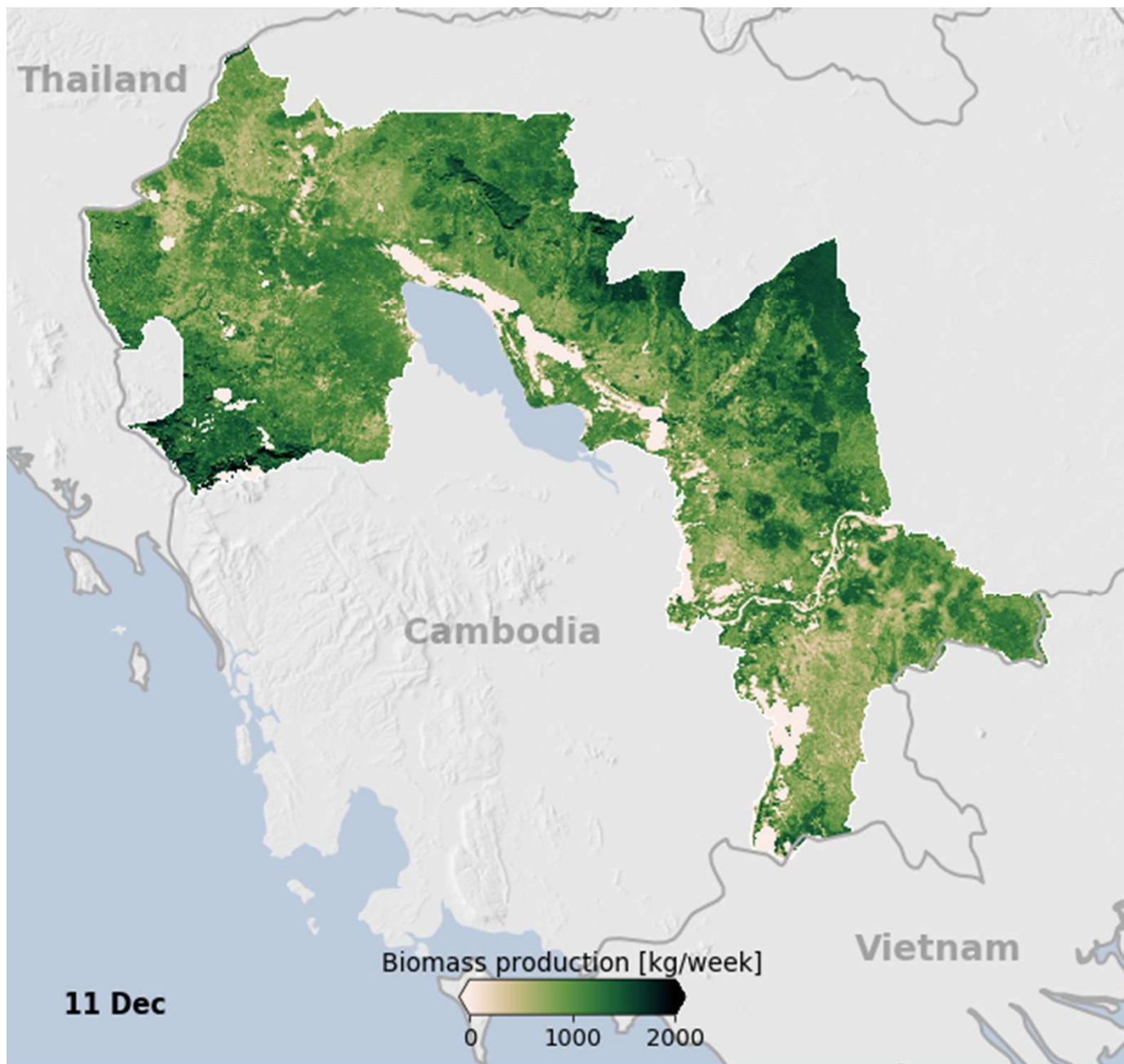
Evapotranspiration

Evapotranspiration **deficit**

Water **productivity**

Biomass **production**

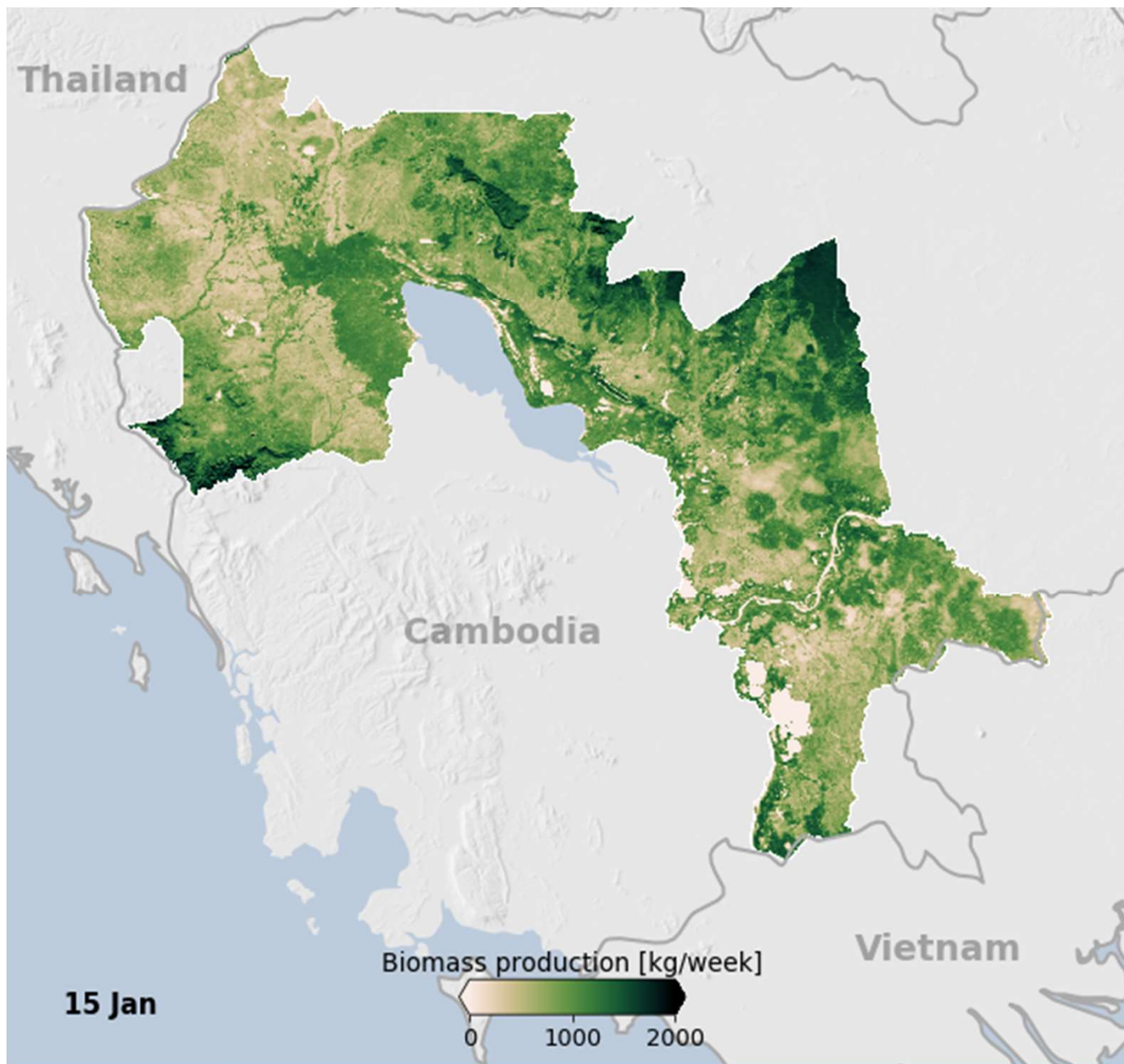




## EO4SD INSIGHTS

Biomass  
production

2017-12

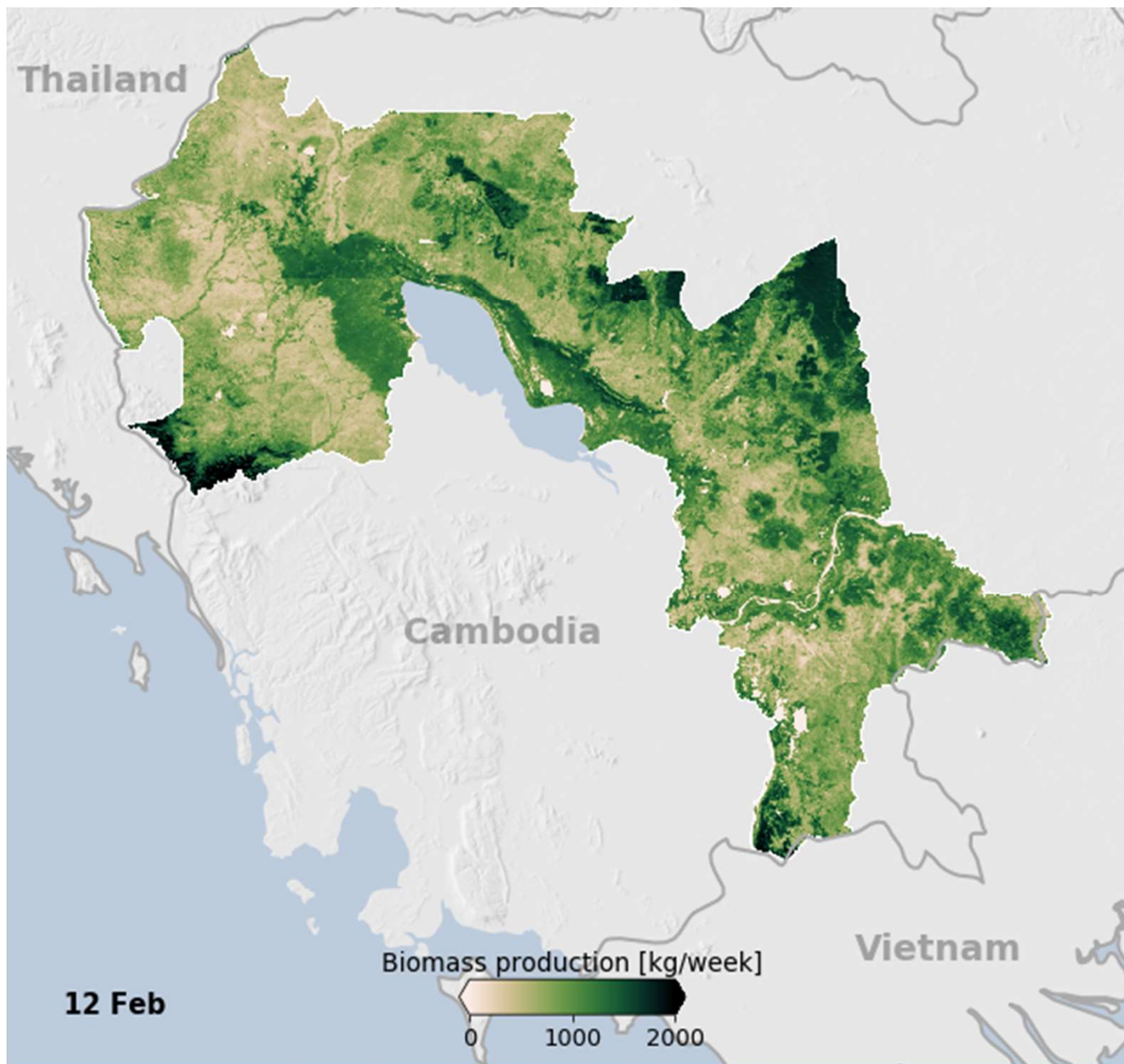


**EO4SD INSIGHTS**

Biomass  
production

**2018-01**

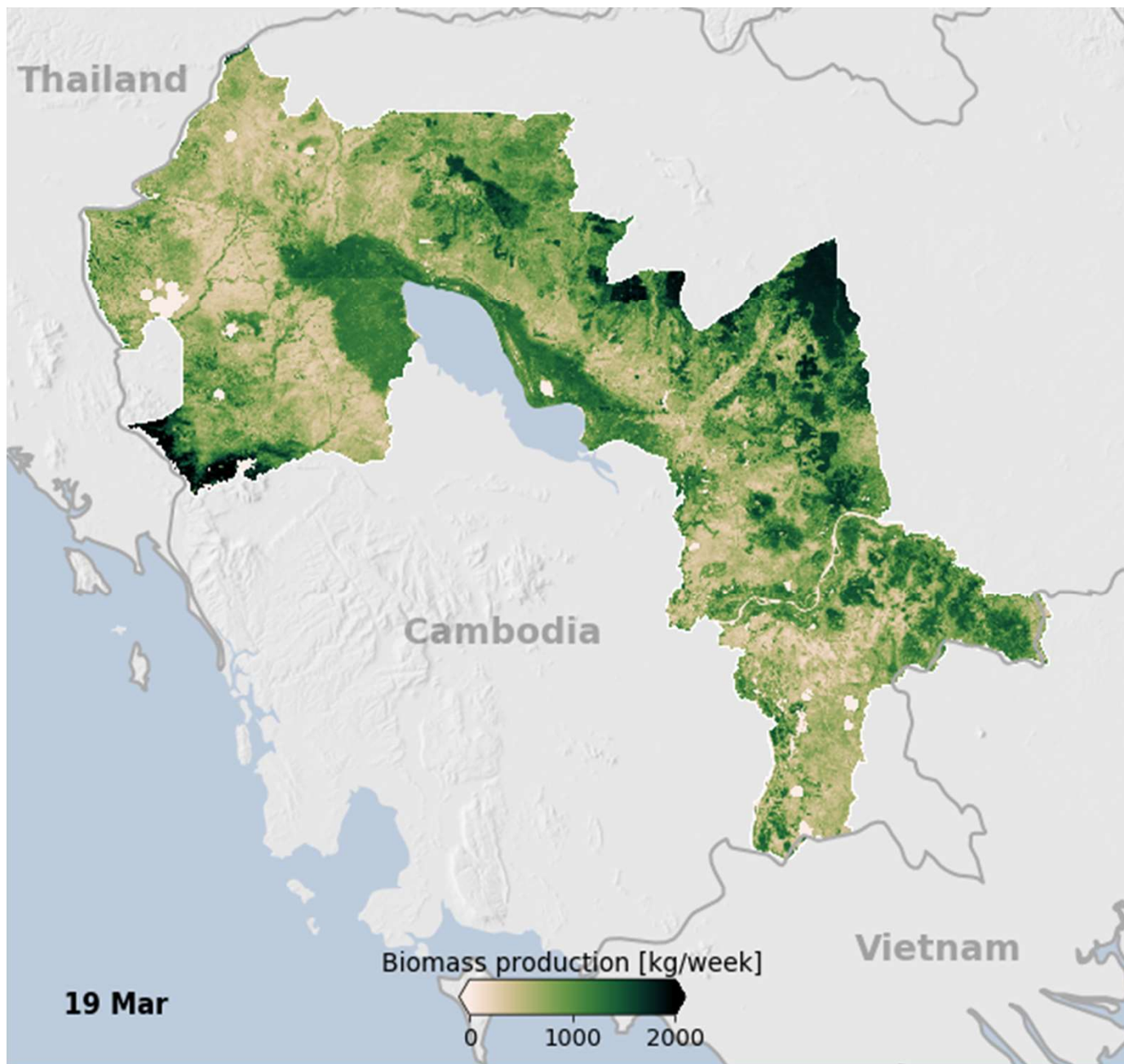




**EO4SD INSIGHTS**

**Biomass  
production**

**2018-02**



**EO4SD INSIGHTS**

Biomass  
production

**2018-03**

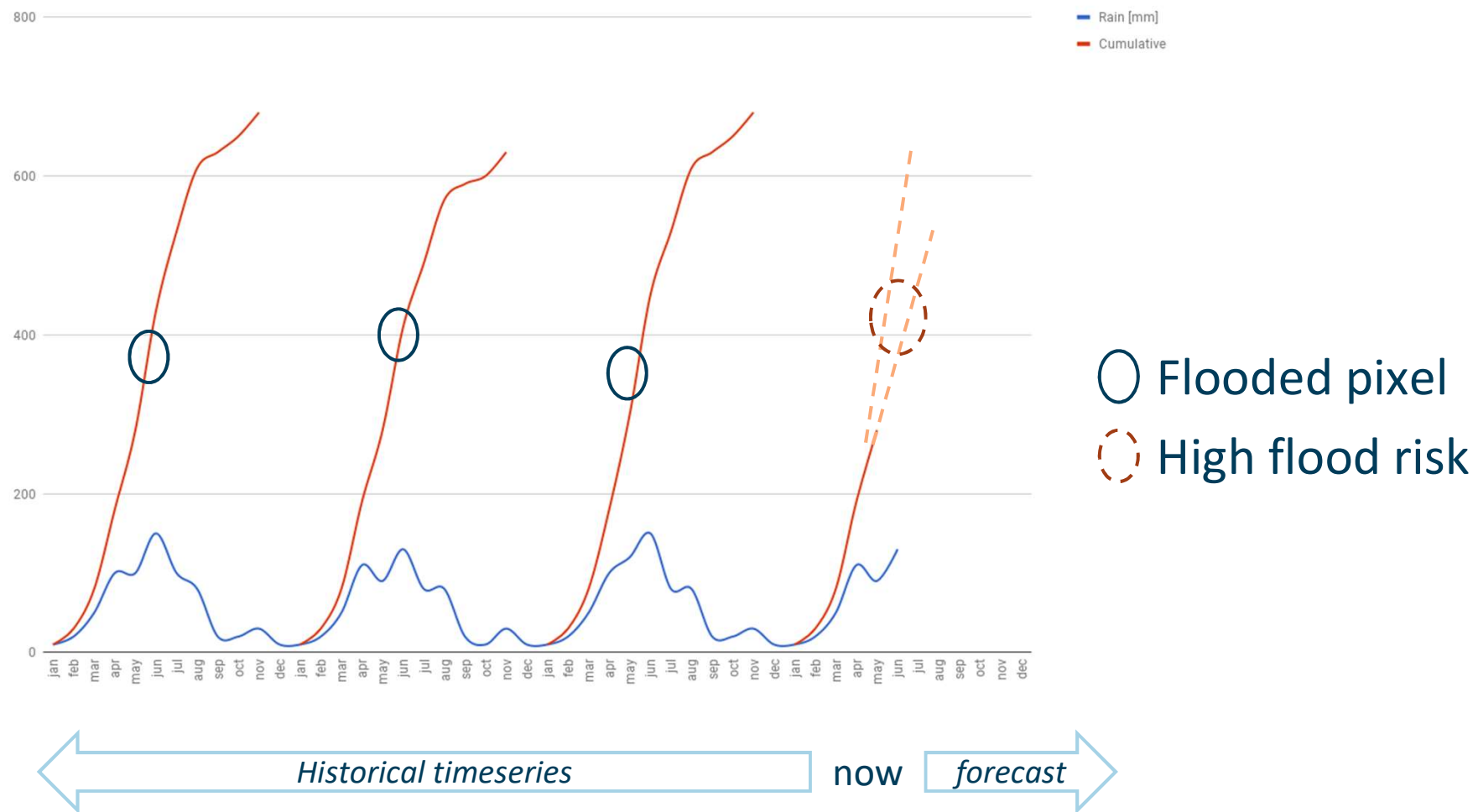


## FROM DATA TO ACTIONABLE SERVICE

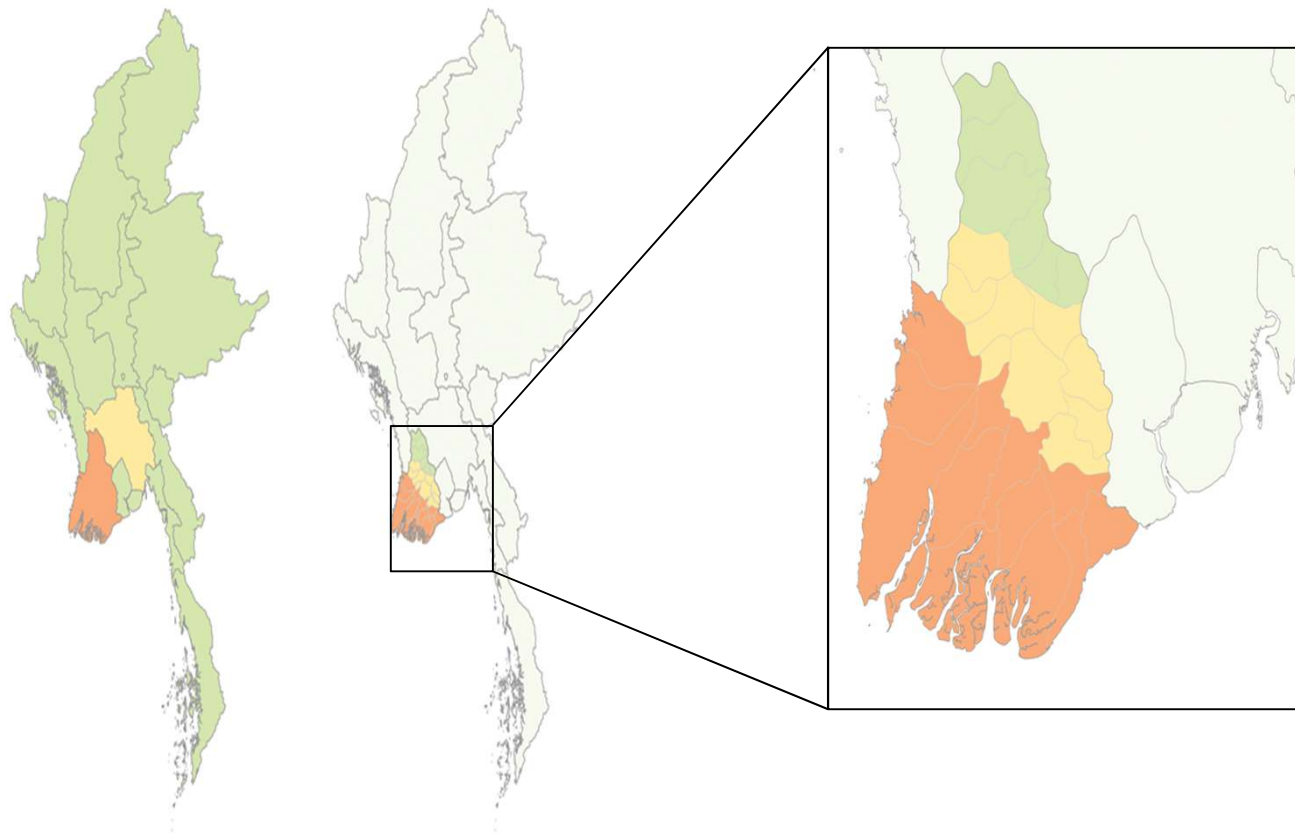
pretty pictures are pretty pictures  
what about me?







## FLOOD RISK ALERTS



Region	Flood risk
1	Low
2	Medium
3	High



***INCREASE* AGRICULTURAL PRODUCTIVITY**

***DECREASE* AGRICULTURAL RISKS**

# EARTH OBSERVATION BASED SERVICES

Real time  
Reliable & Unbiased  
Relevant



# Thank you!

For more information

[\*\*http://eo4sd.esa.int/agriculture\*\*](http://eo4sd.esa.int/agriculture)

[\*\*http://eo4sd.Lizard.net\*\*](http://eo4sd.Lizard.net)