NOVA IMS
Information Management School

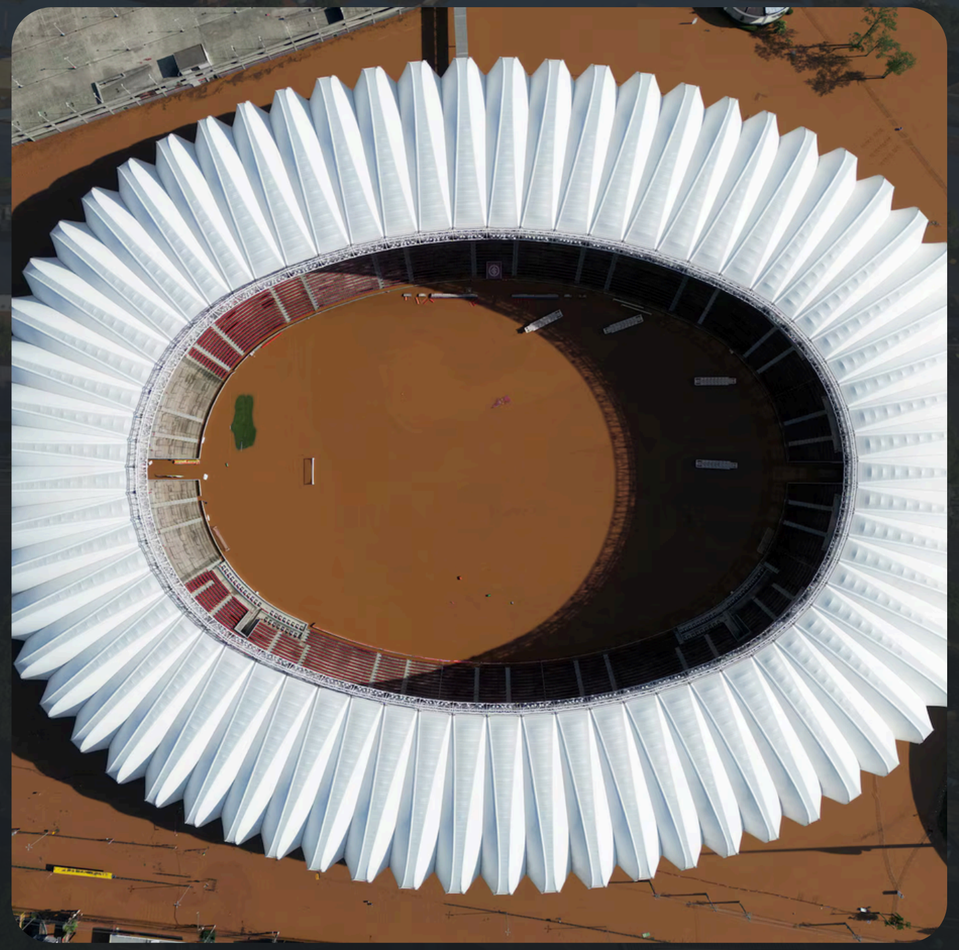
FLOODS IN RIO GRANDE DO SUL

Remote Sensing
24/25

STUDY AREA

Rio Grande do Sul

- Between late April and mid-May 2024
- Severe Floods
- 90% of the state affected
- 2 300 000 people affected

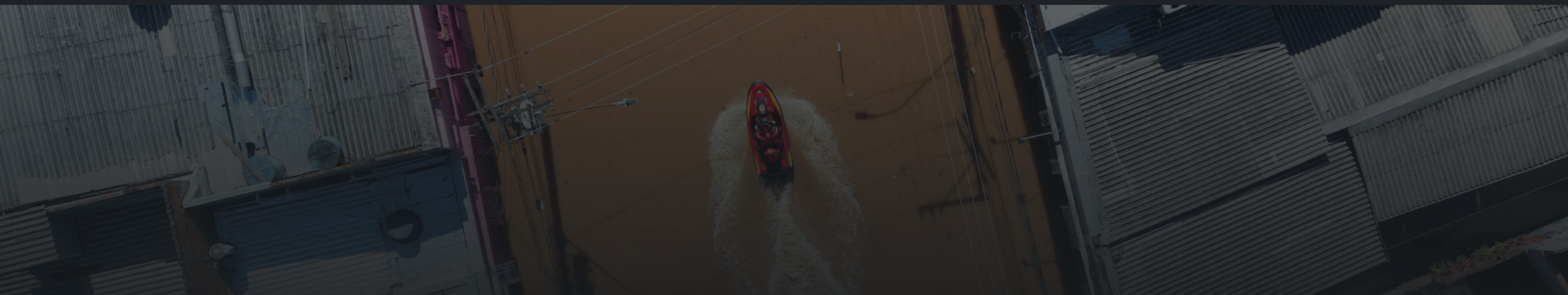


TECHNICAL SPECIFICATIONS

- Minimum Mapping Unit: 1 pixel (~10 m) based on Sentinel-2 data

- Map classes: Water, Urban, Vegetation, Bare Soil

- Sentinel-2 spatial resolution: 10 m (some bands), 20 m (others)



METHODOLOGIES

IMAGE ACQUISITION → EXPLORATORY ANALYSIS → CLASSIFICATION → ACCURACY ASSESSMENT

BAND TRANSFORMATIONS

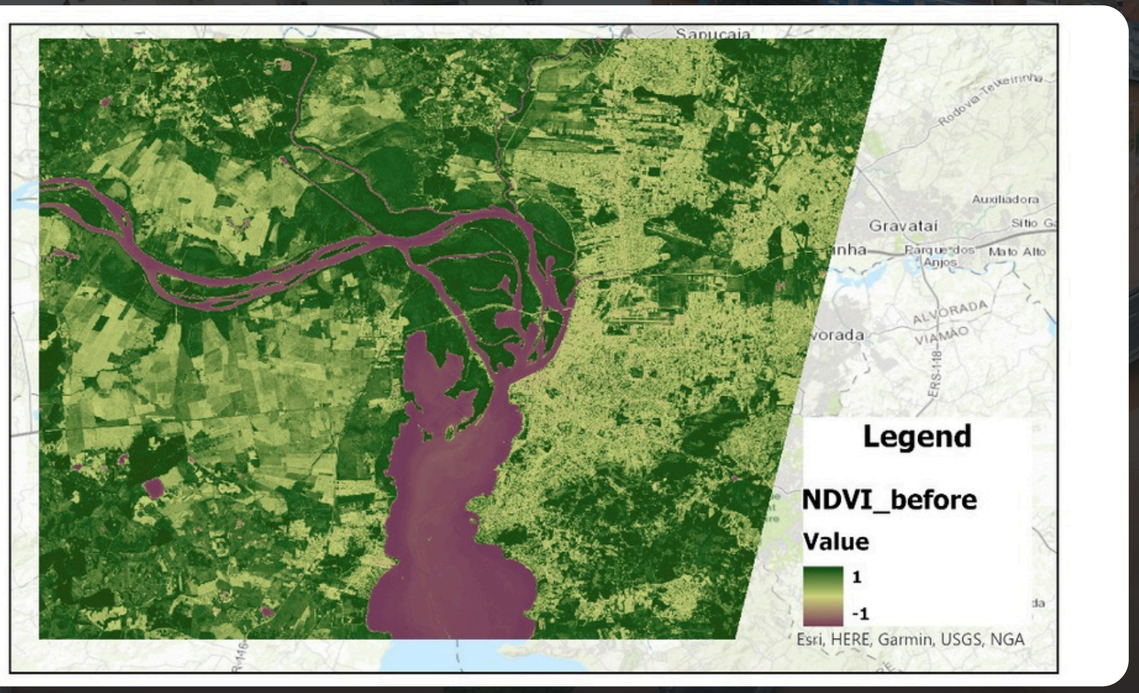


Image before the flood using NDVI

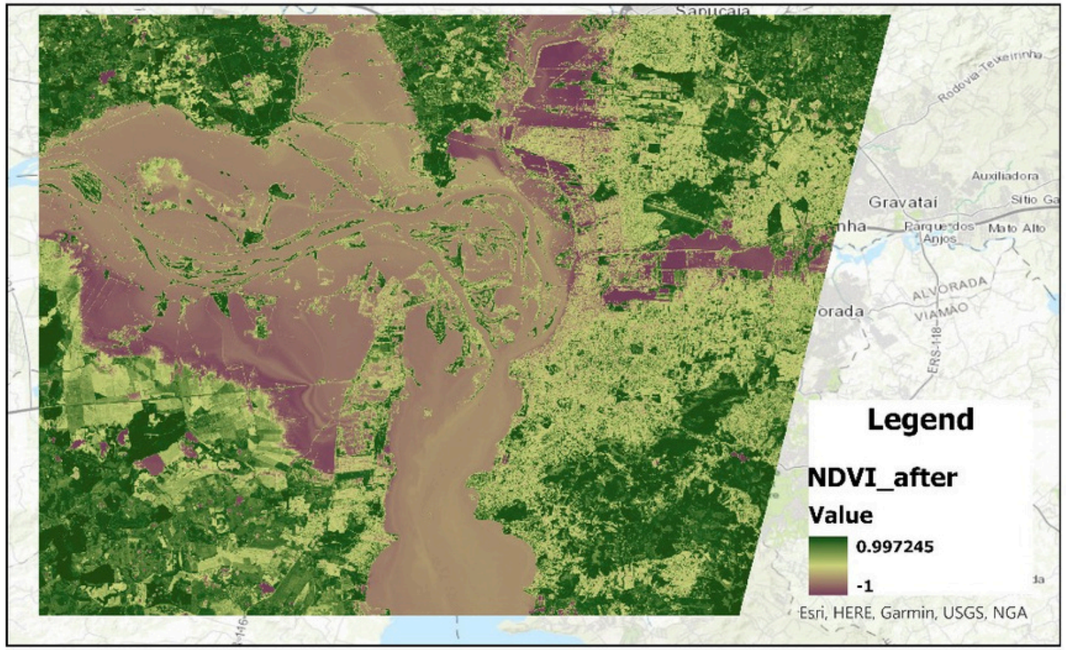
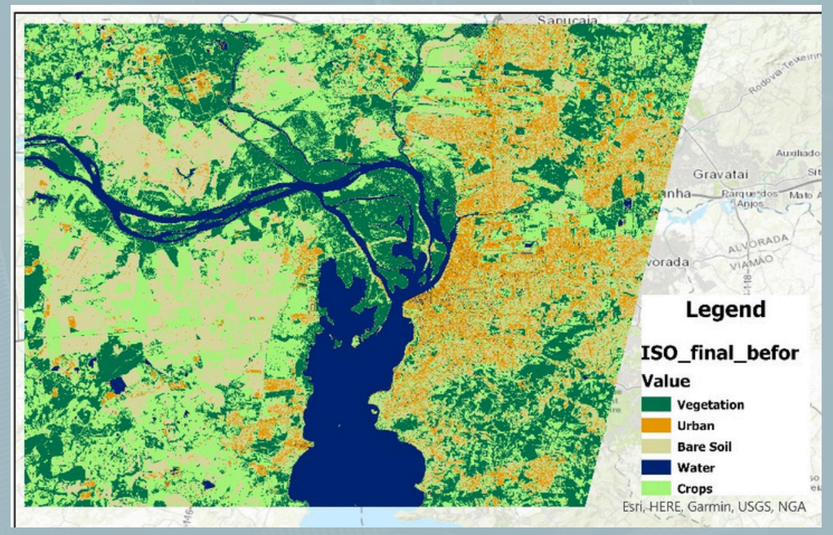


Image afrer the flood using NDVI

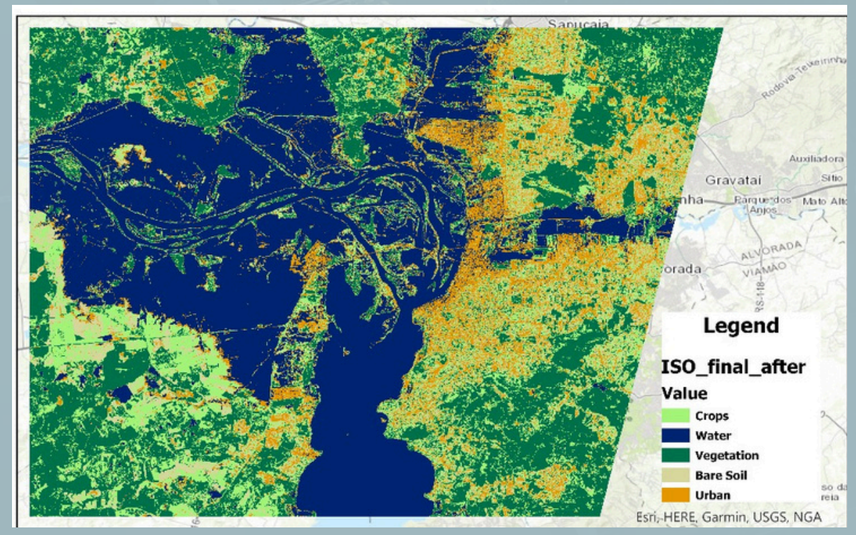
CLASSIFICATION

Unsupervised Classification - Isodata Cluster Classifier

- Isodata algorithm clusters pixels into spectrally similar groups
- Five main land cover categories identified:
  Crops, Water, Vegetation, Bare Soil, Urban Areas



Before the flood

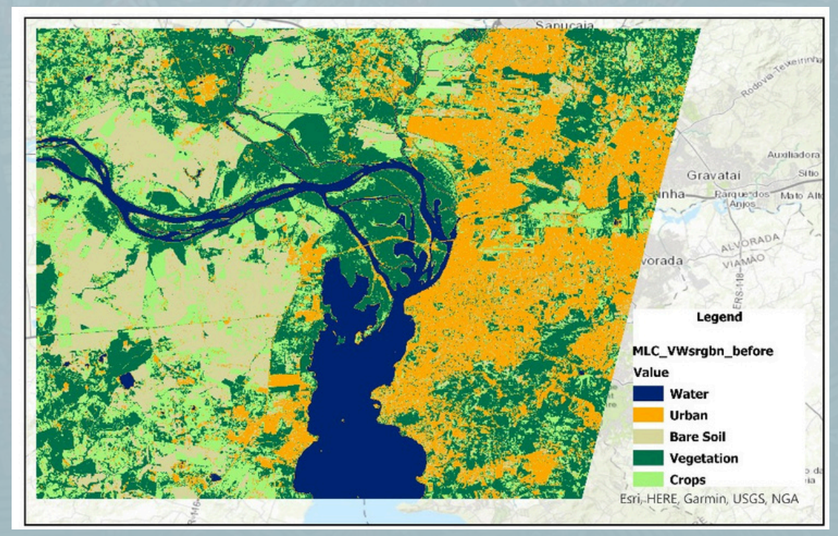


After the flood

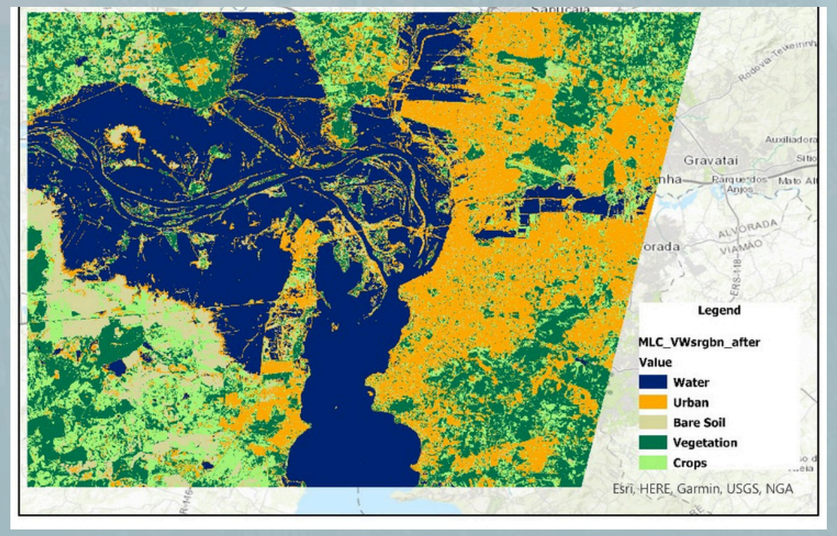
CLASSIFICATION

Supervised Classification - Maximum Likelihood Classifier

- Training areas selected to extract spectral data from bands:
  Blue, Green, Red, NIR, SWIR 2, NDVI, NDWI
- Resulting classes: Water, Urban, Bare Soil, Vegetation, Crops

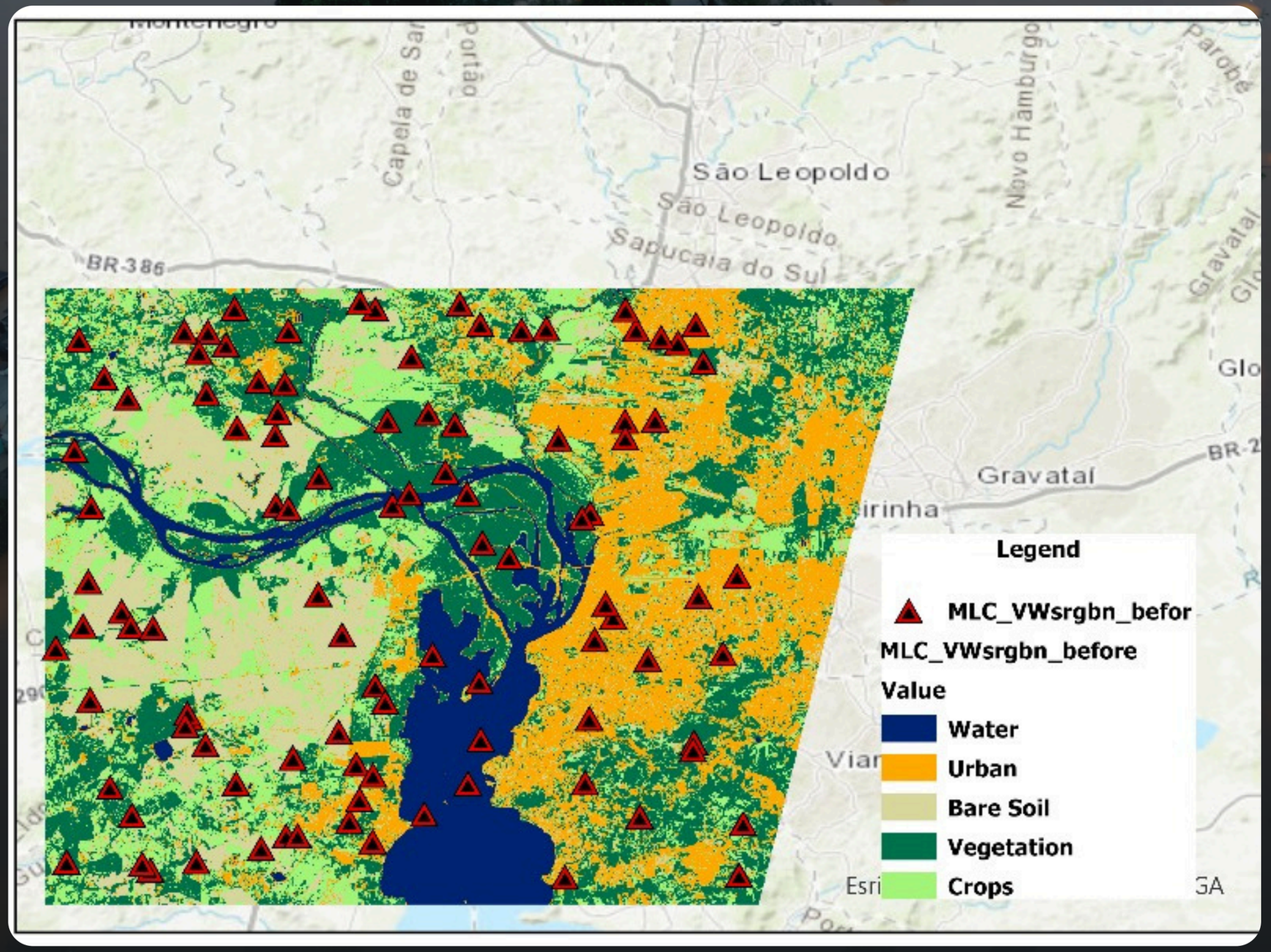


Before the flood



After the flood

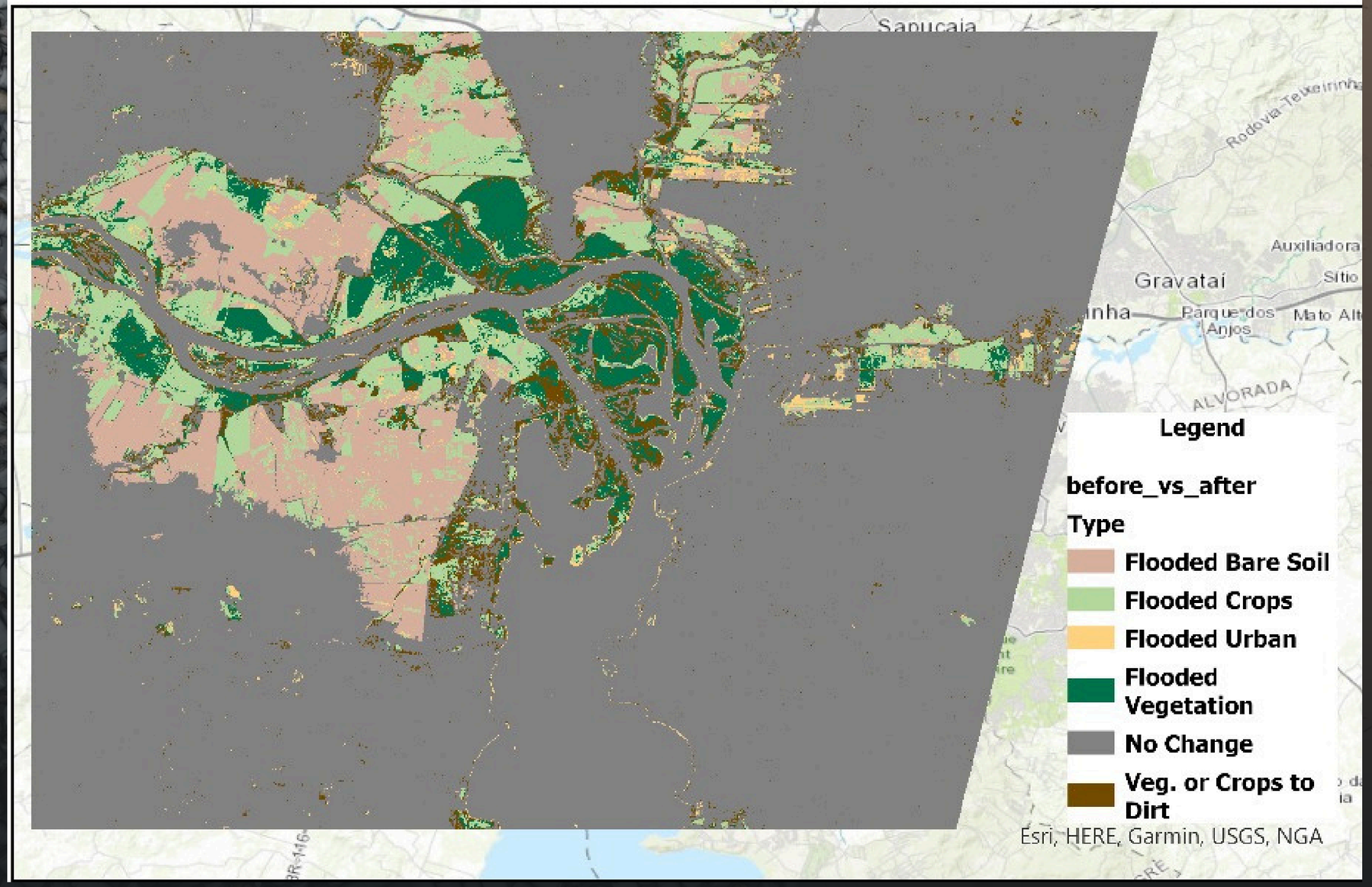
ACCURACY ASSESSMENT



ACCURACY ASSESSMENT

Count of Agreement	Reference						
Map	1	2	3	4	5	Grand Total	**UA**
1	5	0	0	0	0	5	100%
2	1	20	1	0	0	22	91%
3	0	2	12	0	0	14	86%
4	0	0	0	29	4	33	88%
5	0	1	2	4	19	26	73%
Grand Total	**6**	**23**	**15**	**33**	**23**	**100**	
PA	83%	87%	80%	88%	83%		
OA	85%						

MAP COMPARISON



MAP COMPARISON

	After1 (km²)	After2 (km²)	After3 (km²)	After4 (km²)	After5 (km²)
Before 1	166.19	0.00386	0.000089	0.000061	0.00004
Before 2	21.16	303.88	13.04	3.03	24.63
Before 3	139.19	34.91	75.9	0.000323	31.08
Before 4	82.9	41.33	24.96	303.35	44.02
Before 5	130.63	27.91	16.08	30.34	148.6

CONCLUSION

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THANK YOU

Prof. Mário Caetano
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Patrícia Bezerra | 20221907
Rita Silva | 20221920
Vasco Capão | 20221906
Vidhi Rajanikante | 20221982
Yehor Malakhov | 20221691