



European
Commission



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European Big Data Hackathon 2025

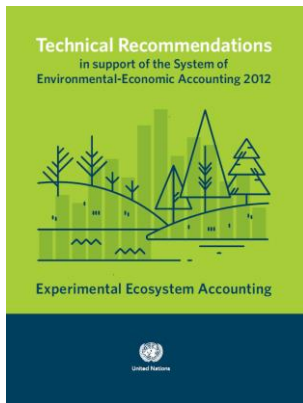
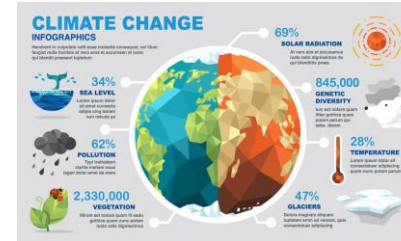
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“On the Policy of Truth” Depeche mode



It's essential to monitor the green in all its different aspects.



“Earth provides enough to satisfy every man's needs, but not every man's greed”
Mahatma Gandhi



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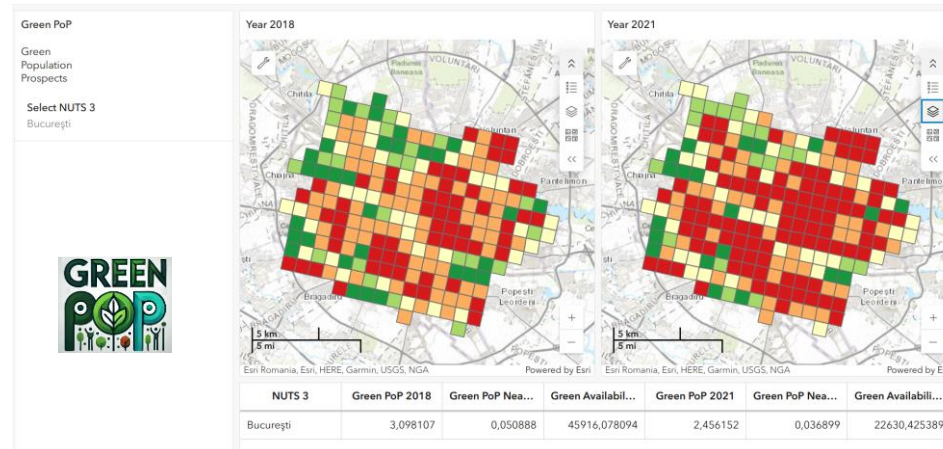


“The answer, my friends, is Blowin’ in the wind” Bob Dylan

Most of people live in urban areas

Our answer is

GREEN-PoP Green Recognition Evaluation European Network Population Prospects



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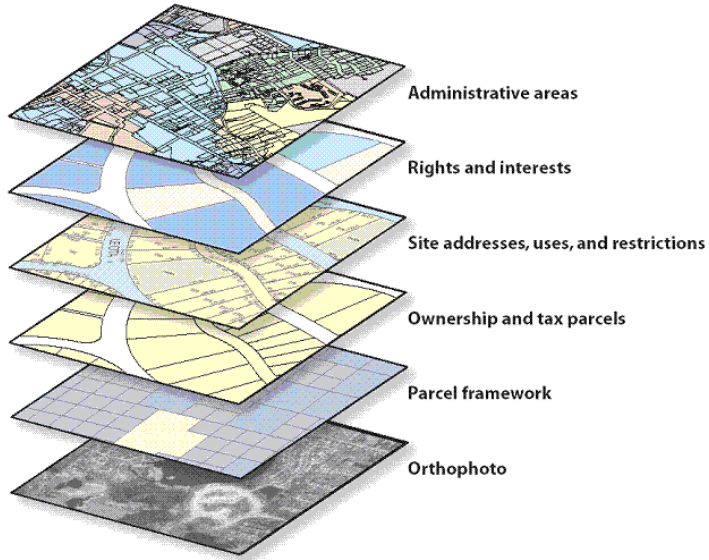
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“I’m the Eye in the Sky”

The Alan Parsons Project



- Sentinel 2 images
- Eurostat Population Grid
- GISCO NUTS 3
- High Density Clusters



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“I’m a dweller on the Threshold” Van Morrison

CDSE:

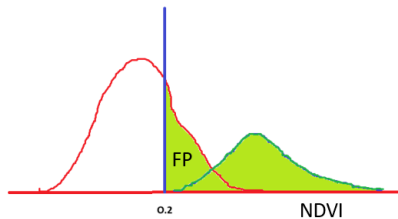
Download 2 periods (spring 2018 and spring 2021) - Spring windows can be depend on latitude of city

28 EU Urban Areas NUTS3 \cap HDC pop > 1 M

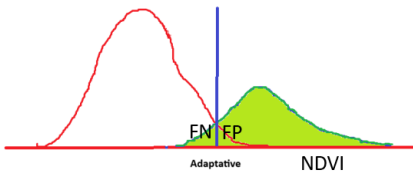
NDVI : Cloud Mask & Temporal median over spring windows

Recognition of green:

Adaptive Threshold on NDVI to create mask of green (ML)



No Adaptive too False positive



Adaptive False Positive **balance** False Negative



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“The Lunatic is on the grass” Pink Floyd

INDICES FOR URBAN AREA:

$$GP = \frac{1}{NUTS_G} \sum_q^{NUTS_G} \frac{V_q}{P_q}$$

Green for population on (100 m² per person)

$$GP_{Near} = \frac{1}{NUTS_G} \sum_q^{NUTS_G} \frac{V_q}{P_q^Q}$$

Green for population near (100 m² per person)

$P_q^Q = \Sigma$

| | | |
|----------|----------|----------|
| P_{q1} | P_{q2} | P_{q3} |
| P_{q4} | P_q | P_{q5} |
| P_{q6} | P_{q7} | P_{q8} |

$$PW_{Use} = \frac{1}{NUTS_G} \sum_q^{NUTS_G} v_q P_q^Q$$

Population near green weighted with green density



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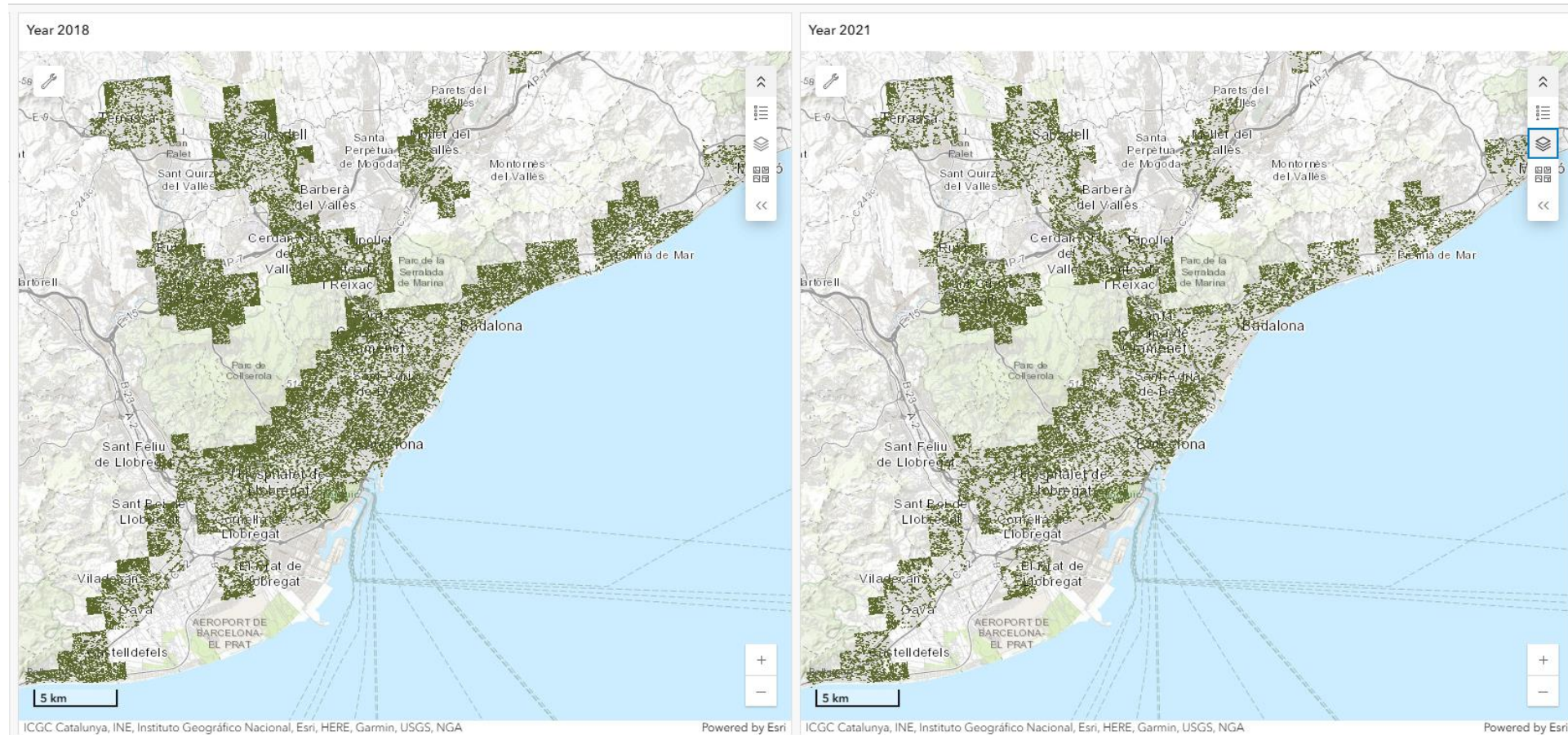
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“La Tierra negra se vuelve verde” Carlos Santana

Case of study: Barcelona - 4. Green amount (NDVI above threshold)



| NUTS 3 | Green PoP 2018 | Green PoP Near 2018 | Green Availability 2018 | Green PoP 2021 | Green PoP Near2021 | Green Availability 2021 |
|-----------|----------------|---------------------|-------------------------|----------------|--------------------|-------------------------|
| Barcelona | 2,196302 | 0,046965 | 28910,736615 | 1,247671 | 0,024725 | 14610,160418 |



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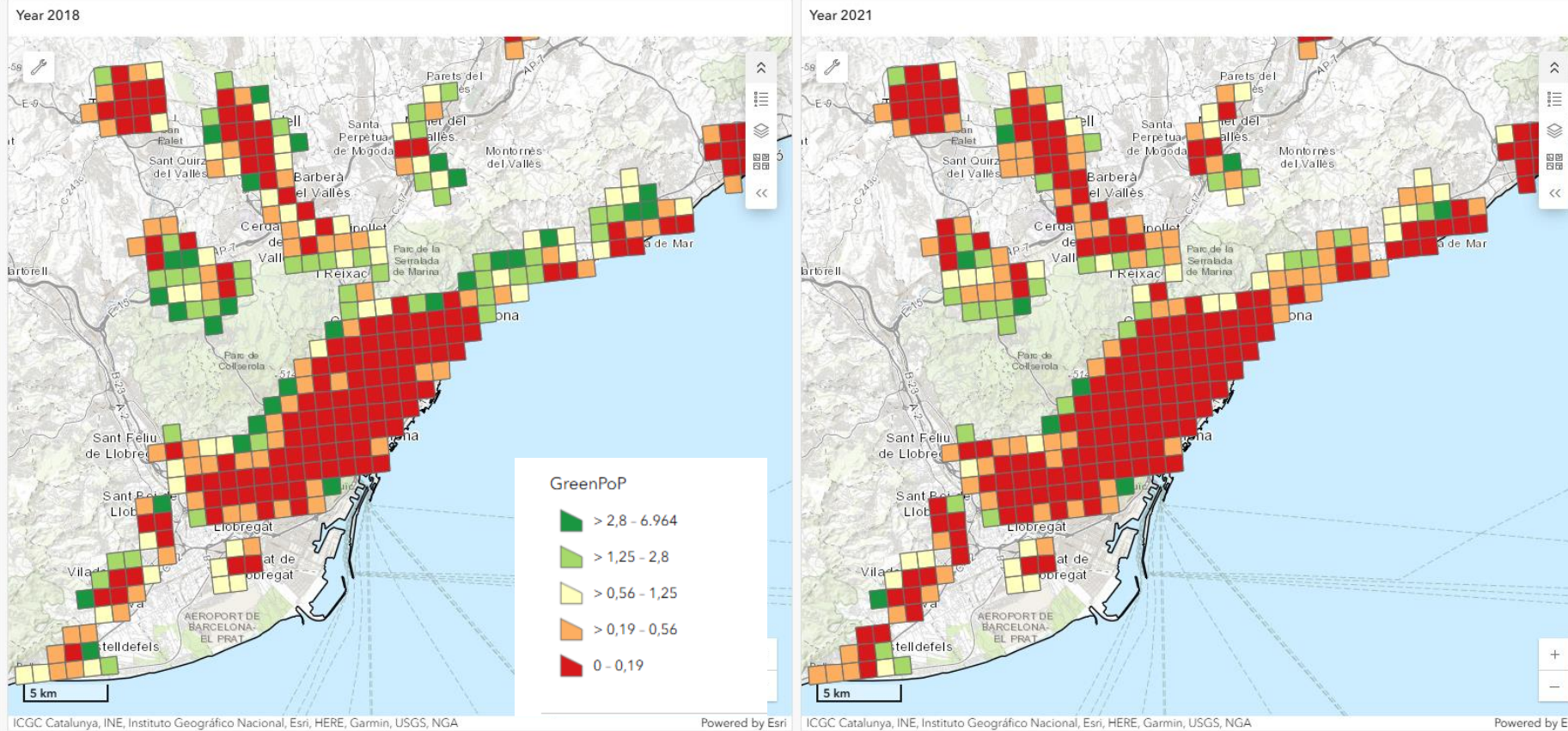
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“Somewhere Over the Rainbow” Judy Garland

Case of study: Barcelona - 1. Green to population ratio (GreenPop)

$$GP = \frac{1}{NUTS_G} \sum_q \frac{NUTS_G V_q}{P_q}$$



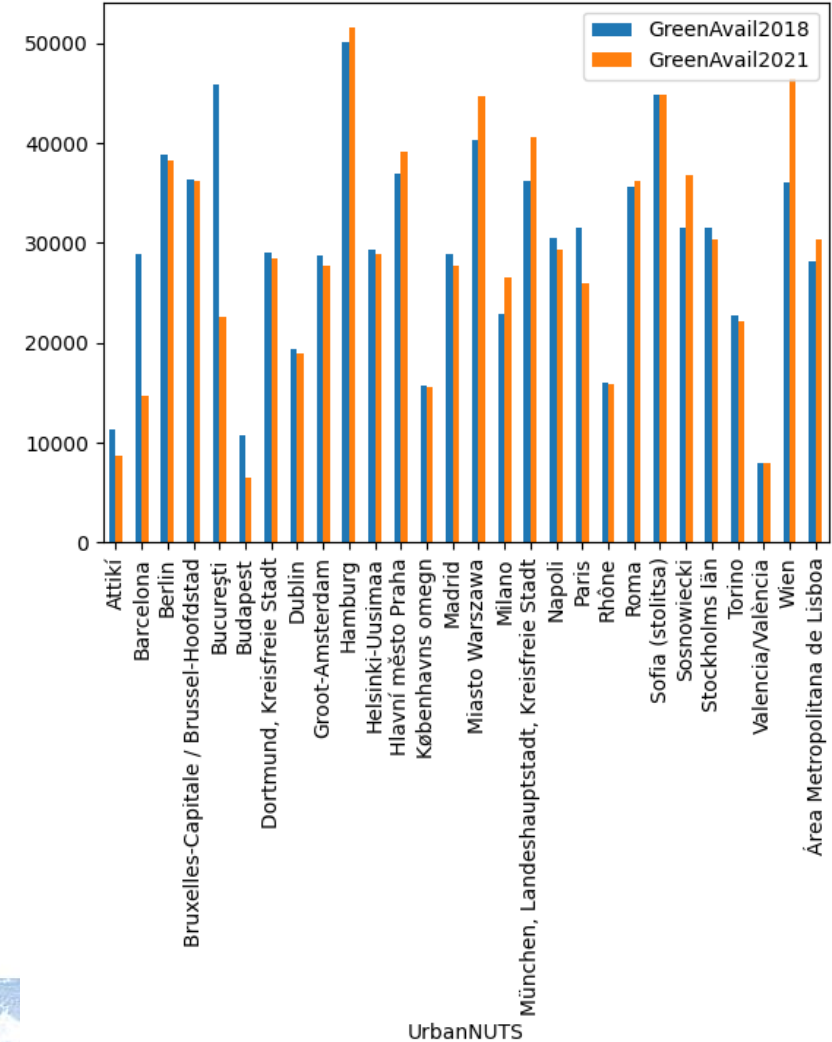
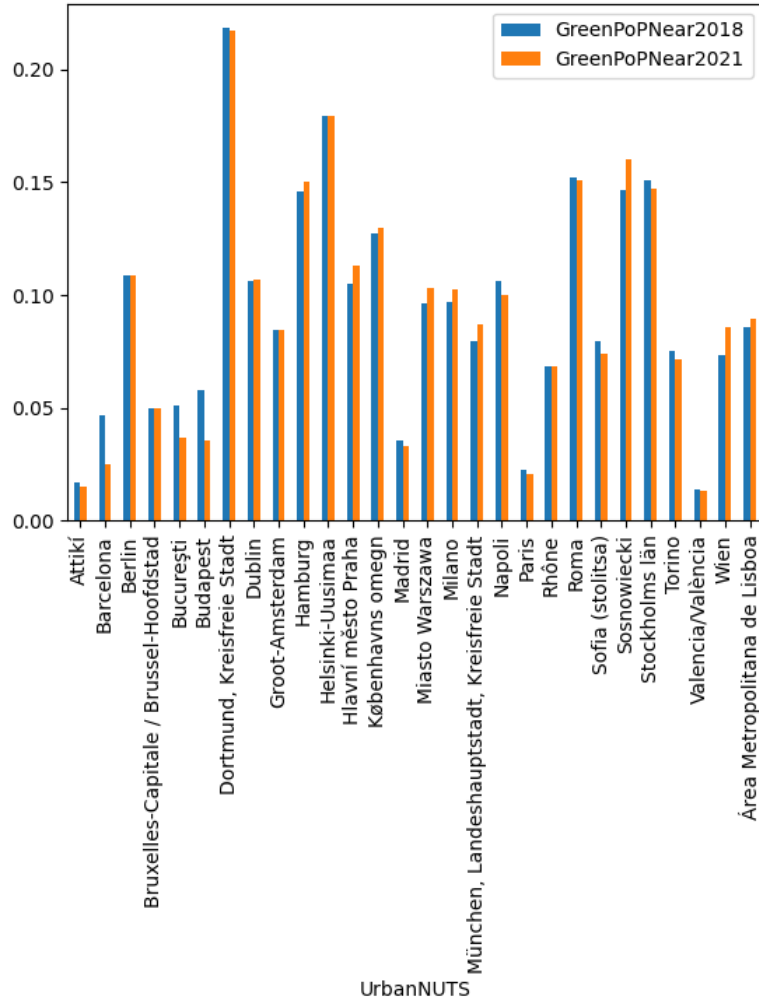
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When explanations make no sense SOS



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Thanks



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