Session ITS4.12/NH13.15 - Nature-based Solutions for climate change adaptation: From Concept to Action 2025 April 29<sup>th</sup>



### Characterizing green infrastructures multi-scale spatial configuration to better understand their ecological performances

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## INTRODUCTION

- Various scales for NbS : from large natural parks to small green spaces
- Size, shape, connectivity and proximity : spatial configuration of this green infrastructure
- Plays a role in conservation of biodiversity and providing of ecosystemic services
- Land take : legal constraint & competition for space

What sizes and locations for green patches ?

Which land use indicators are relevant to characterize green infrastructures? At which scales?

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### INDICATORS



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## CASE STUDY: NIORT CONURBATION

Average French city

Urban area of 122 302 inhabitants (2021)

Mostly agricultural

500m, 1km, 2km, 4km & 8km grids

Land use/land cover data from 2018, vector data (high resolution)



LULC categories for Niort Conurbation (year 2018, data OCS GE)



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## CORRELATION ANALYSIS - 2KM GRID

### Spatial configuration

- Green spaces aggregation positively correlated to evenne
- Isolation (fractal dimension) quite correlated t
  density (p = 0,72 for green spaces)

#### **Composition**

- Green spaces and trees share very correlated (p = 0,92), but not so predictive of natural sho
- Artificial share positively correlated to grass s (p = 0,94)



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## **CORRELATION ANALYSIS — ACROSS SCALES**

- Grass positively correlated to land take across scales
- Green spaces and trees mostly negatively correlated to agricultural land : competition for space left free from land taking

Supplementary information (compared to land take share) :

- At small scales (from 500m to 2km), further information brought by trees and natural land shares, and green spaces evenness (Shannon index)
- At bigger scales (4km and 8km), share of green spaces brings more information

# **ENVIRONMENTAL EVALUATION**

Environmental evaluation through modelling :



Water run-off (Multi-Hydro)



Access to nature



**Biodiversity networks (Graphab)** 

Correlation analysis between land use indicators and environmental indicators



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## Thank you for your attention !

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### TYPOLOGY

PCA and hierarchical clustering (2km grid), 5 clusters :

- 1 Very artificialised land : **urban centre**
- 2 Less green spaces, smaller fractal dimension

3 – **Natural land** : around the Sèvre niortaise river and natural park

4 – Green spaces core area higher, fragmentation & evenness smaller

5 – Forest areas

