



Illegal dumping and urban design. Some evidence from Fix My Street data, Brussels.

Madeleine GUYOT, Isabelle THOMAS, Sophie VANWAMBEKE

IGU 19 July 2022



Madeleine Guyot @GuyotMadeleine

Wow, that's a lot ! Is it possible to study their location?
[@CIRB_CIBG](#)

Seven tonnes of rubbish dumped in Brussels streets every day

Wednesday, 06 May 2020



© Alan Stanton/Flickr

Source: The Brussels Times, Alan Hope, may 2020



CIRB - CIBG  @CIRB_CIBG

Replying to [@GuyotMadeleine](#)

Don't know if it's useful, but there's a illegal dumps category in Fix My Street. Data are open access.
[#BRIC](#) [#Brussels](#) [#fixmystreet](#) [#smartbru](#) [#smartcity](#)



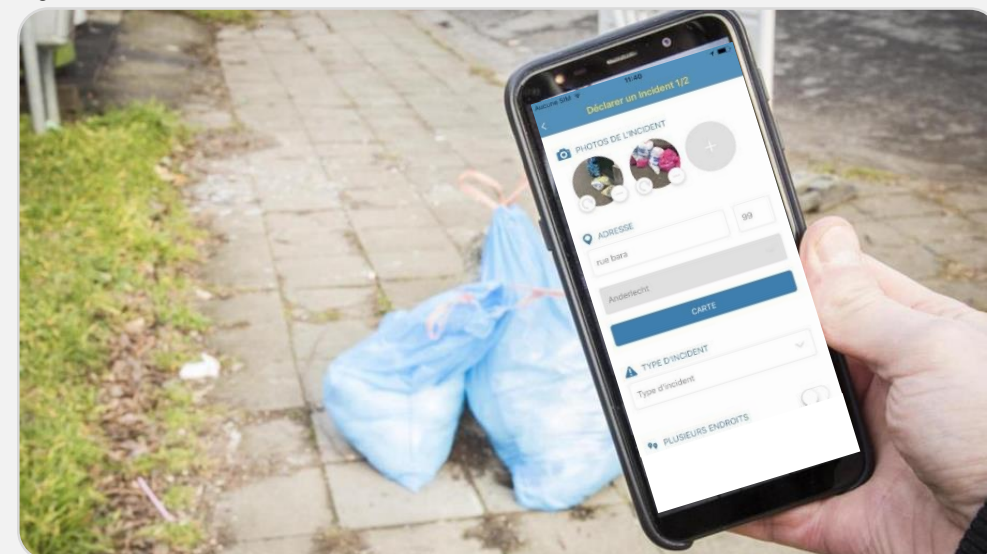
fixmystreet.brussels 
Report incidents in the Brussels public area



Sophie Vanwambeke @s_vanwambeke

Replying to [@GuyotMadeleine](#) and [@CIRB_CIBG](#)

I just tried the application, it works well. Go for it !





Madeleine Guyot @GuyotMadeleine

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© Alan Stanton/Flickr

Source: The Brussels Times, Alan Hope, may 2020



Isabelle Thomas @IsabLThomas

Replying to [@GuyotMadeleine](#)

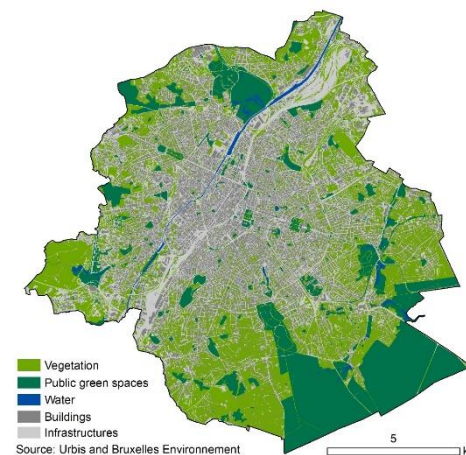
What do you mean by Brussels? What do you want to study? The region? The agglomeration? The municipality?



Madeleine Guyot @GuyotMadeleine

Replying to [@IsabLThomas](#)

Fix My Street data are available for the Brussels-Capital Region (19 municipalities).



Brussels-Capital Region

- 161 km²
- 1,2 million of inhabitants
- 54% vegetation (parks, forests, private gardens, boulevard trees, etc.)
- Presence of the European institutions



Isabelle Thomas @IsabLThomas – february 2020

Replying to [@GuyotMadeleine](#)



And what is your research question?

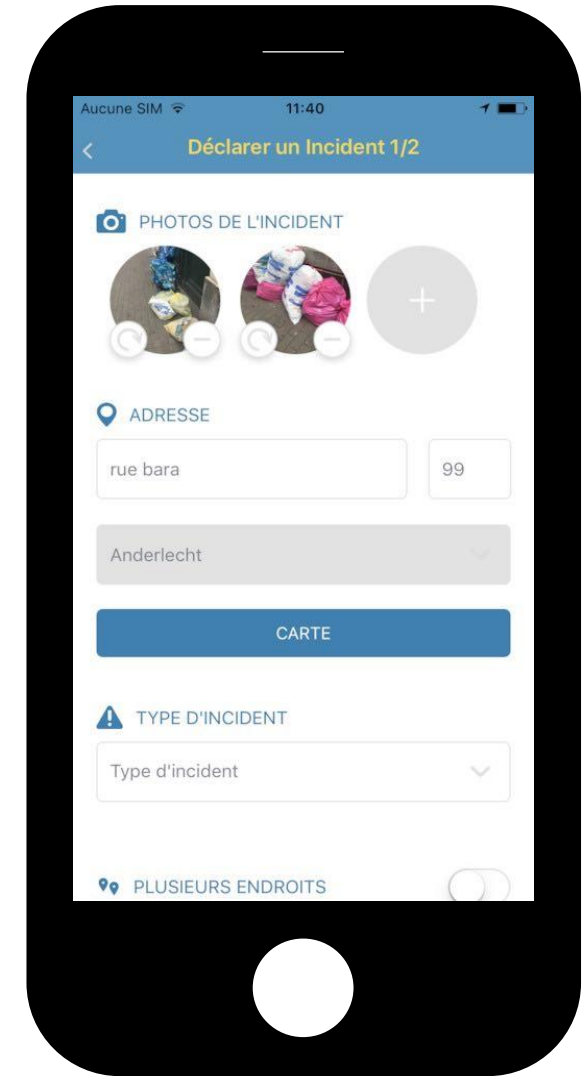
Is the urban context a factor associated with **illegal dumping**, at a micro scale and at a meso scale ?



Fix My Street data: citizen sensor

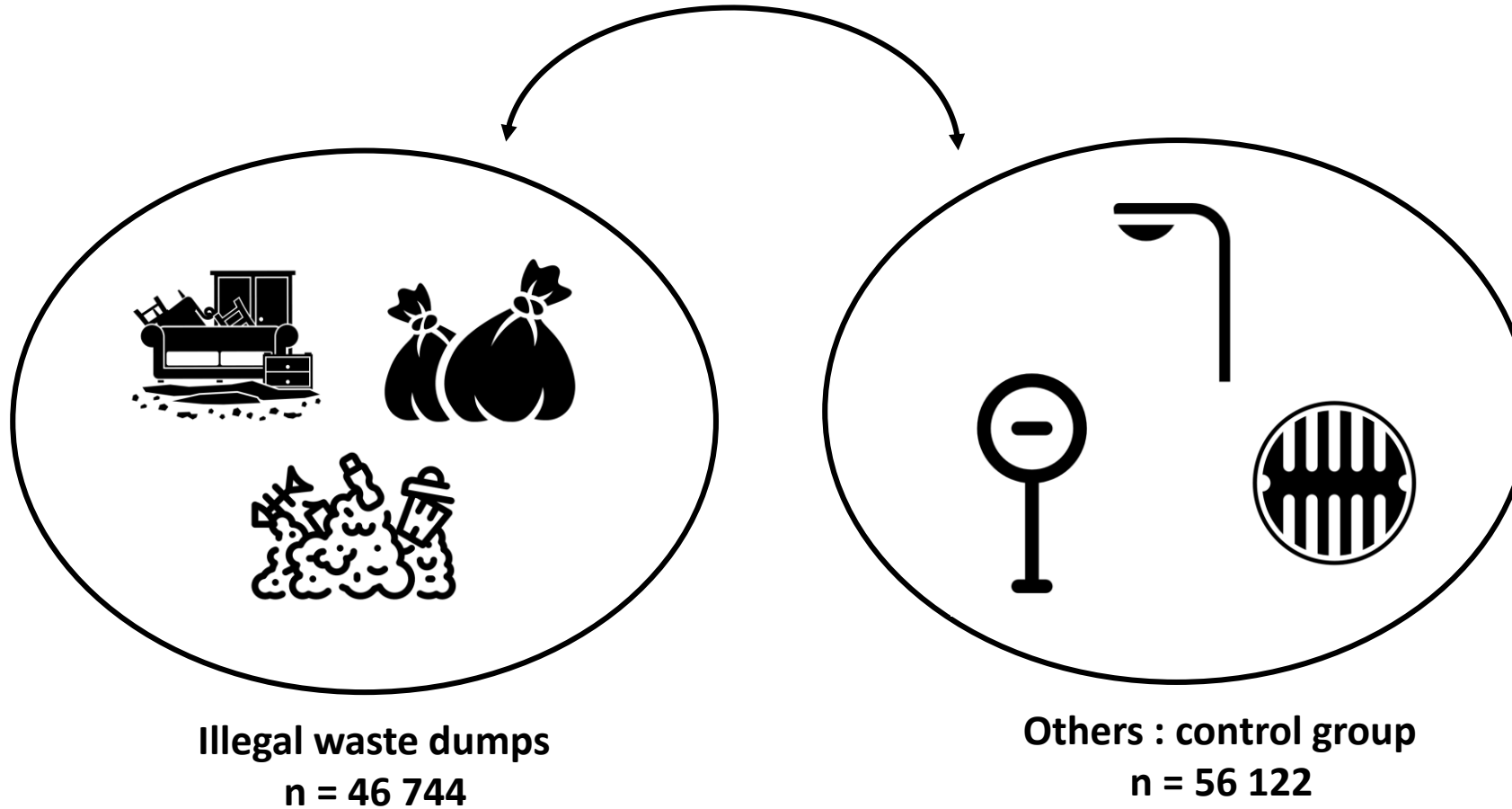


- **internet** and **mobile** platform
 - for the **citizen** and the **administration**
 - to report incidents in the public space.
-
- Data source : CIRB
 - Between July 2017 and February 2020 (included)



How to use these data ?

Comparison of the two groups



Examples :

Public lighting turned off
Traffic sign broken
Sewer grid clogged

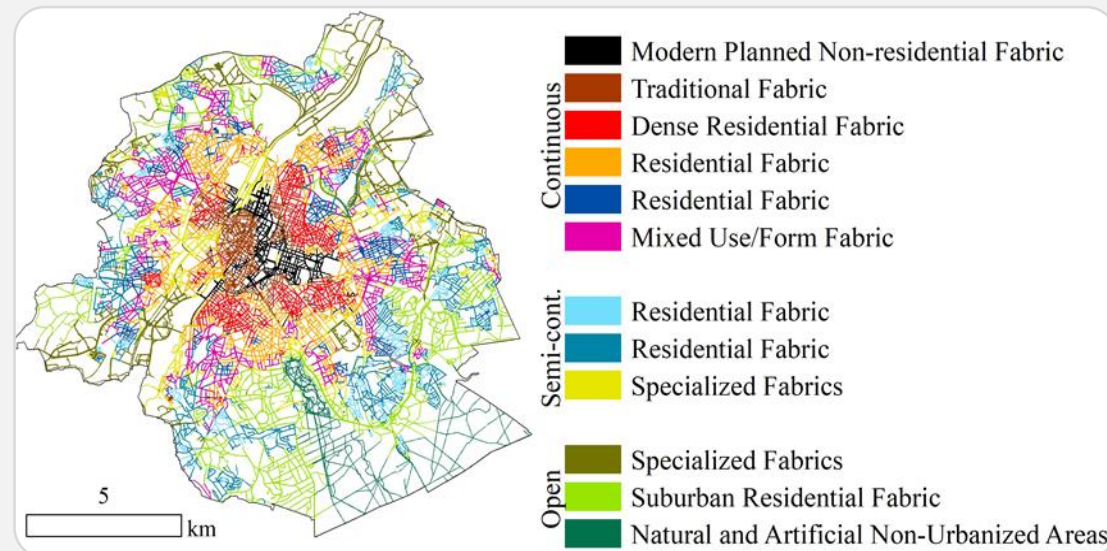


Alessandro Araldi @AlessandroAral2

Replying to @GuyotMadeleine

You want to study this on a **meso scale**? You should try to see the **association between illegal dumping and the typology of urban fabrics** that we have developed together.

#streetscape #MFAprotocol #Brussels #vegetation



Source: Guyot et al., 2020 doi.org/10.1016/j.landurbplan.2020.103947



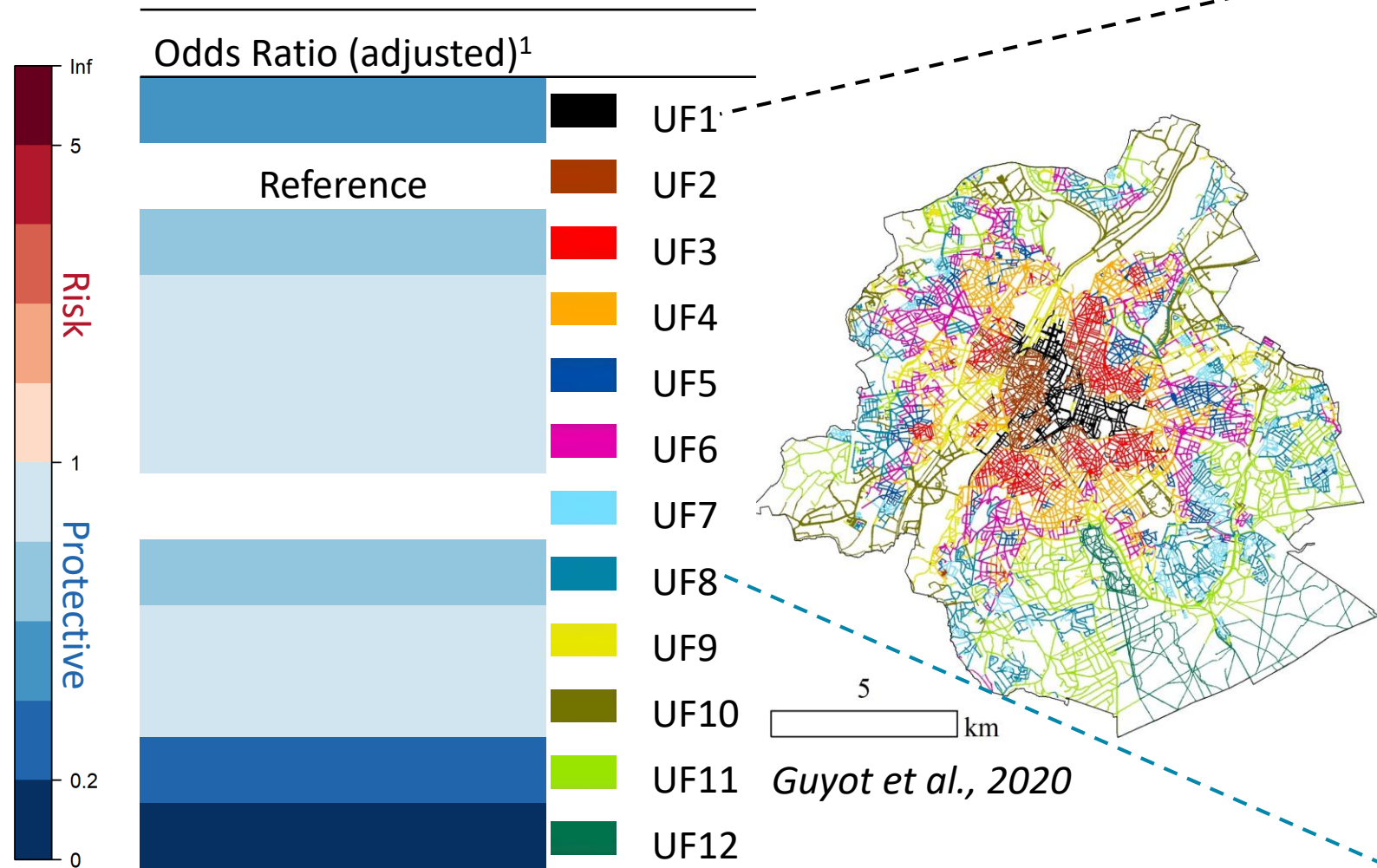
Madeleine Guyot @GuyotMadeleine

Replying to @AlessandroAral2



Look at the results!

Illegal dump ~ *meso* urban environment



¹With *Household median income*



Source: Google Earth and Google Street View

UF1 Continuous Modern Planned Non-Residential Fabric



Source: Google Earth and Google Street View

UF2 Continuous Traditional Fabric

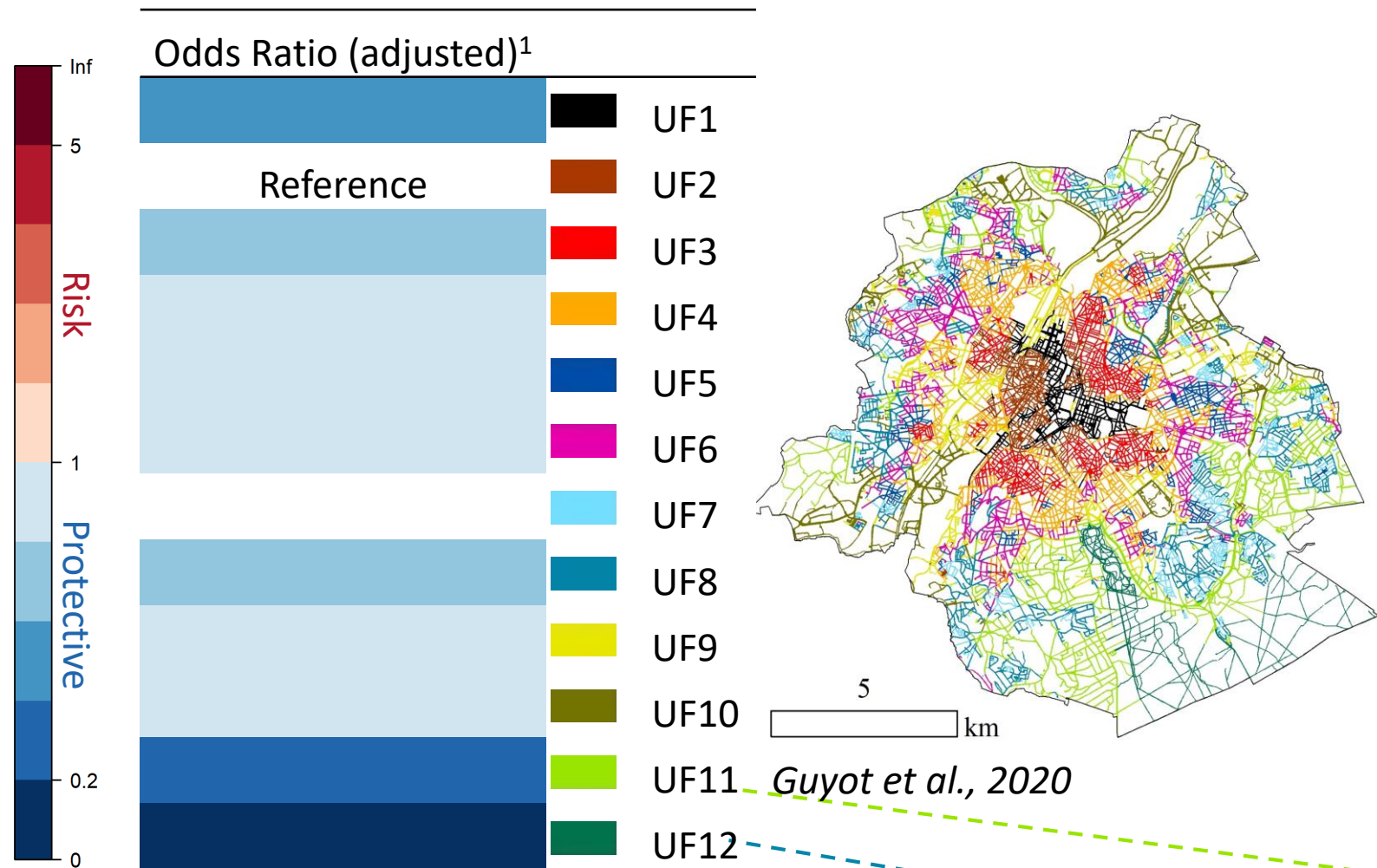


Source: Google Earth and Google Street View

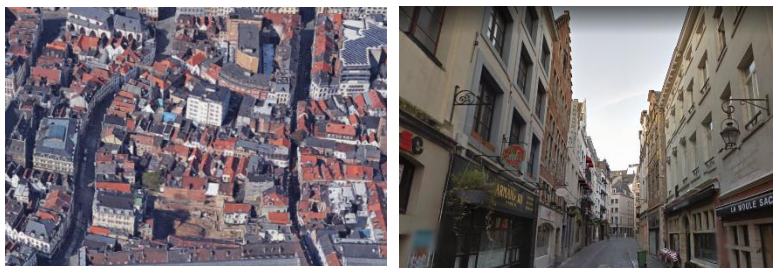
UF8 Semi-continuous Residential Fabric with houses and average buildings



Illegal dump ~ *meso* urban environment



¹With *Household median income*



Source: Google Earth and Google Street View

UF2 Continuous Traditional Fabric



Source: Google Earth and Google Street View

UF11 Open Suburban Residential Fabric

UF12 Open Natural and Artificial Non-Urbanized Areas





Sophie Vanwambeke @s_vanwambeke

Replying to @GuyotMadeleine

Interesting! And what did you mean by focusing also on a **micro scale**?



Madeleine Guyot @GuyotMadeleine

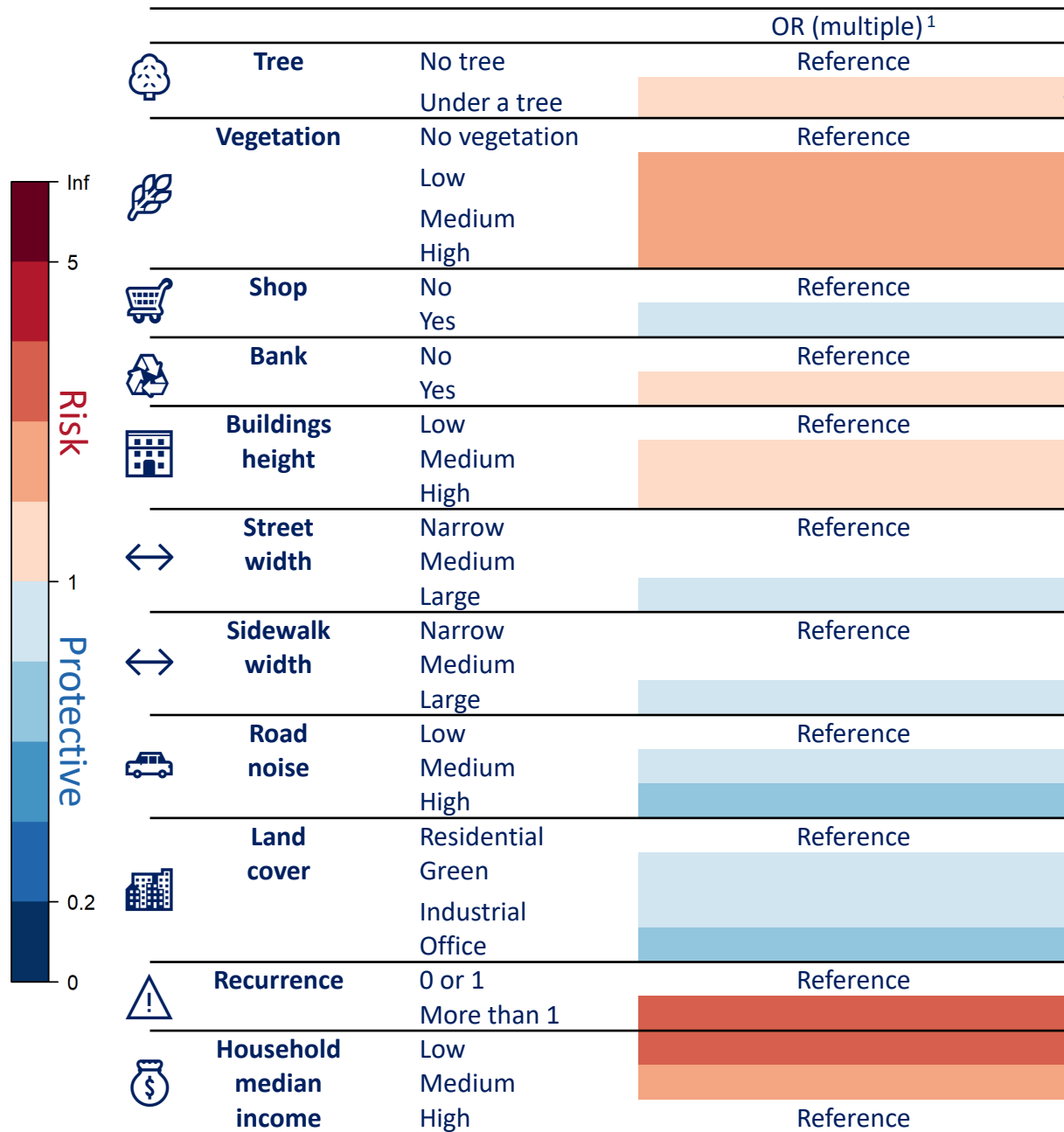
Replying to @s_vanwambeke

I want to investigate more precisely what specific elements of the urban context are associated with illegal dumping.



Data of *micro* urban environnement

Name	Computation
<i>Tree</i>	Distance to nearest tree less than 10m [Yes/No].
<i>Vegetation cover</i>	Ratio of vegetation cover within 100m.
<i>Shop</i>	Distance to the nearest shop less than 20 m [Yes/No].
<i>Bank</i>	Distance to the nearest glass or clothes bank less than 20m [Yes/No].
<i>Building height</i>	Average height of buildings in the section of street (between two junctions) in which the incident is located
<i>Street width</i>	Width of the street at the point of the incident.
<i>Sidewalk width</i>	Sidewalk width at the level of the incident.
<i>Road noise</i>	Annual mean road noise level [dB].
<i>Land cover</i>	Type of land cover at the point
<i>Recurrence</i>	Number of incidents of the same group within 10m.
<i>Median income</i>	Value of the statistical sector.

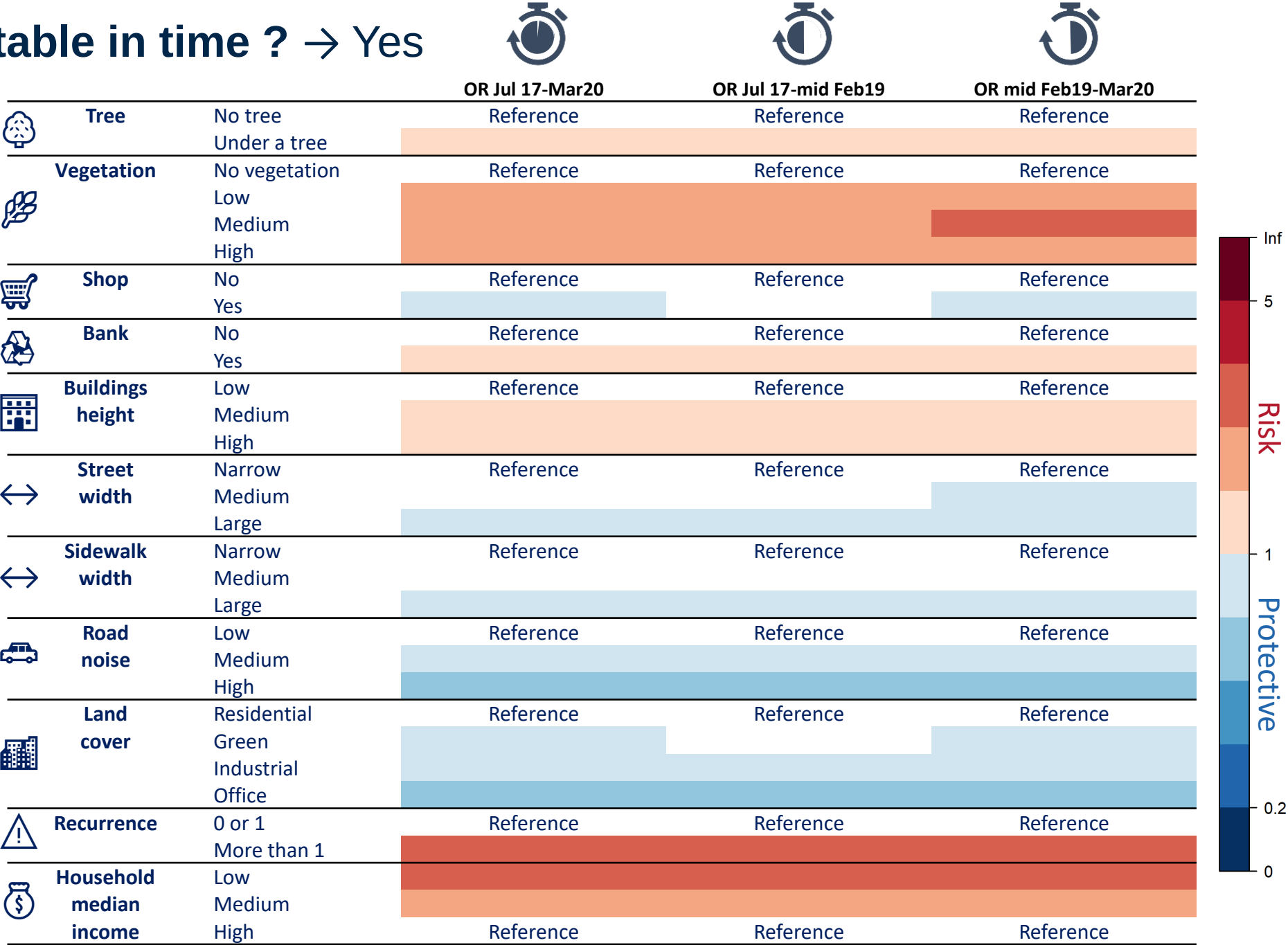


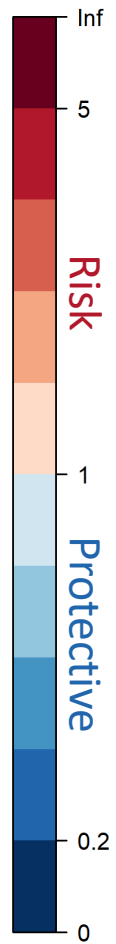
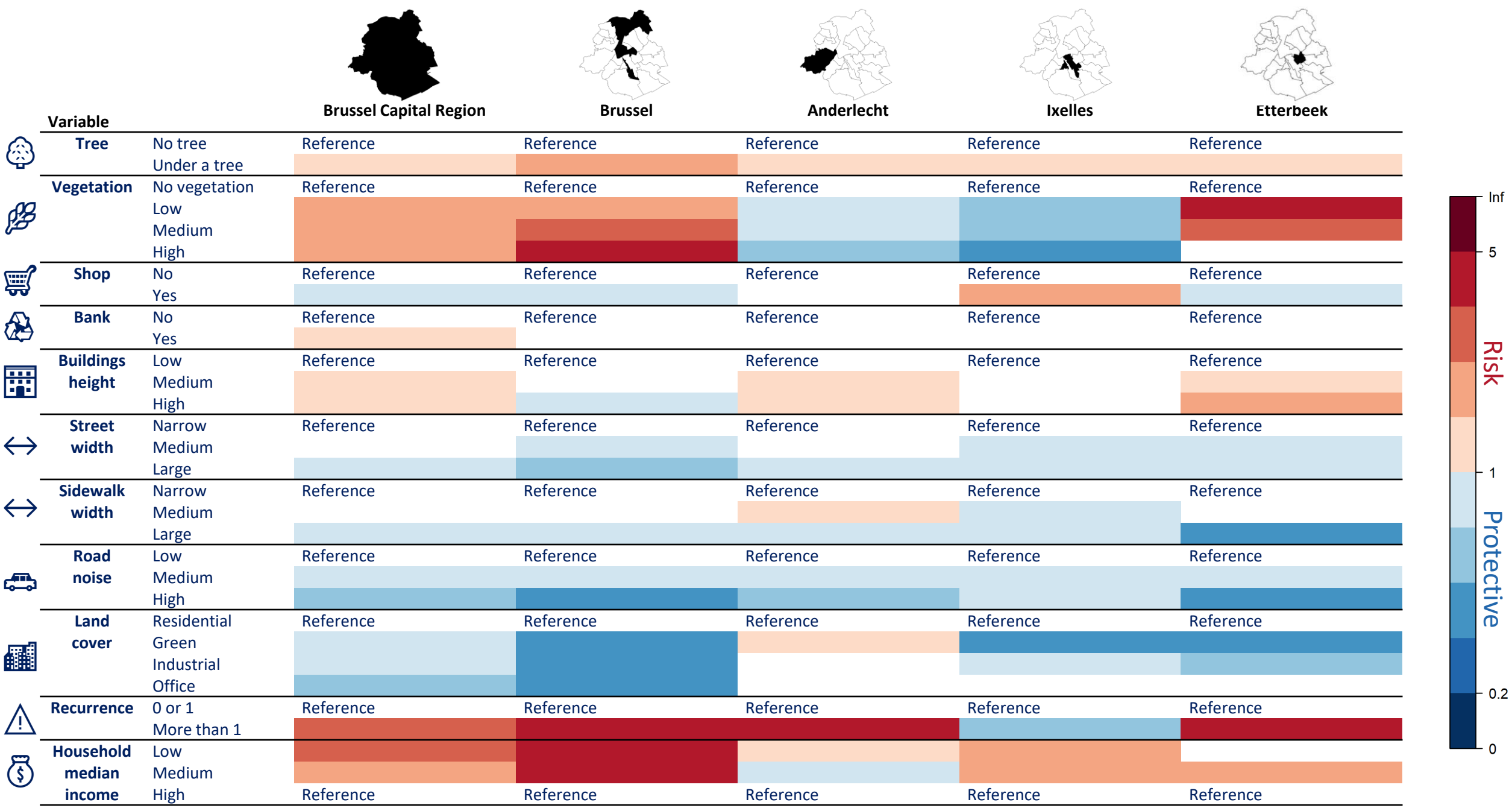
Typical street where there is a greater risk of finding a illegal dump



¹ + Municipality

Is the result stable in time ? → Yes







Isabelle Thomas @IsabLThomas

Replying to @GuyotMadeleine

This **spatial heterogeneity** is very intriguing! Could we take the analysis further? **Getting beyond the boundaries of the municipalities.**



Sophie Vanwambeke @s_vanwambeke

Replying to @IsabLThomas

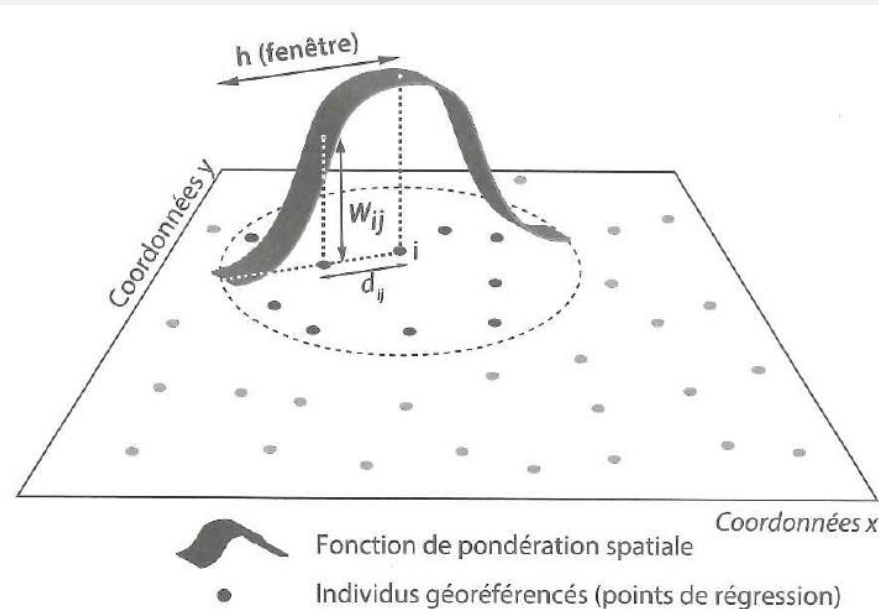
We could try a **weighted spatial regression!**



Madeleine Guyot @GuyotMadeleine

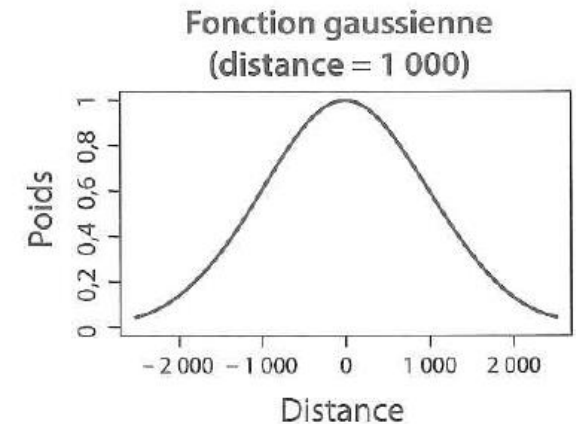
Replying to @s_vanwambeke

I've never tried it, why not!



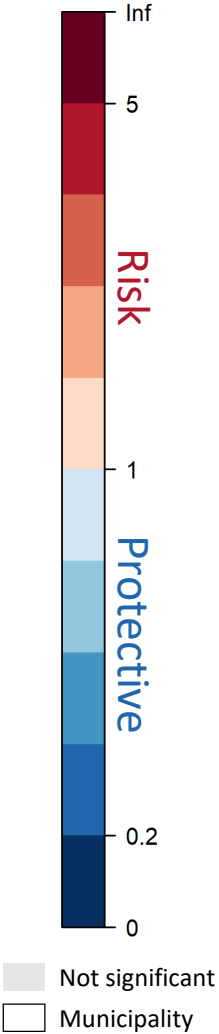
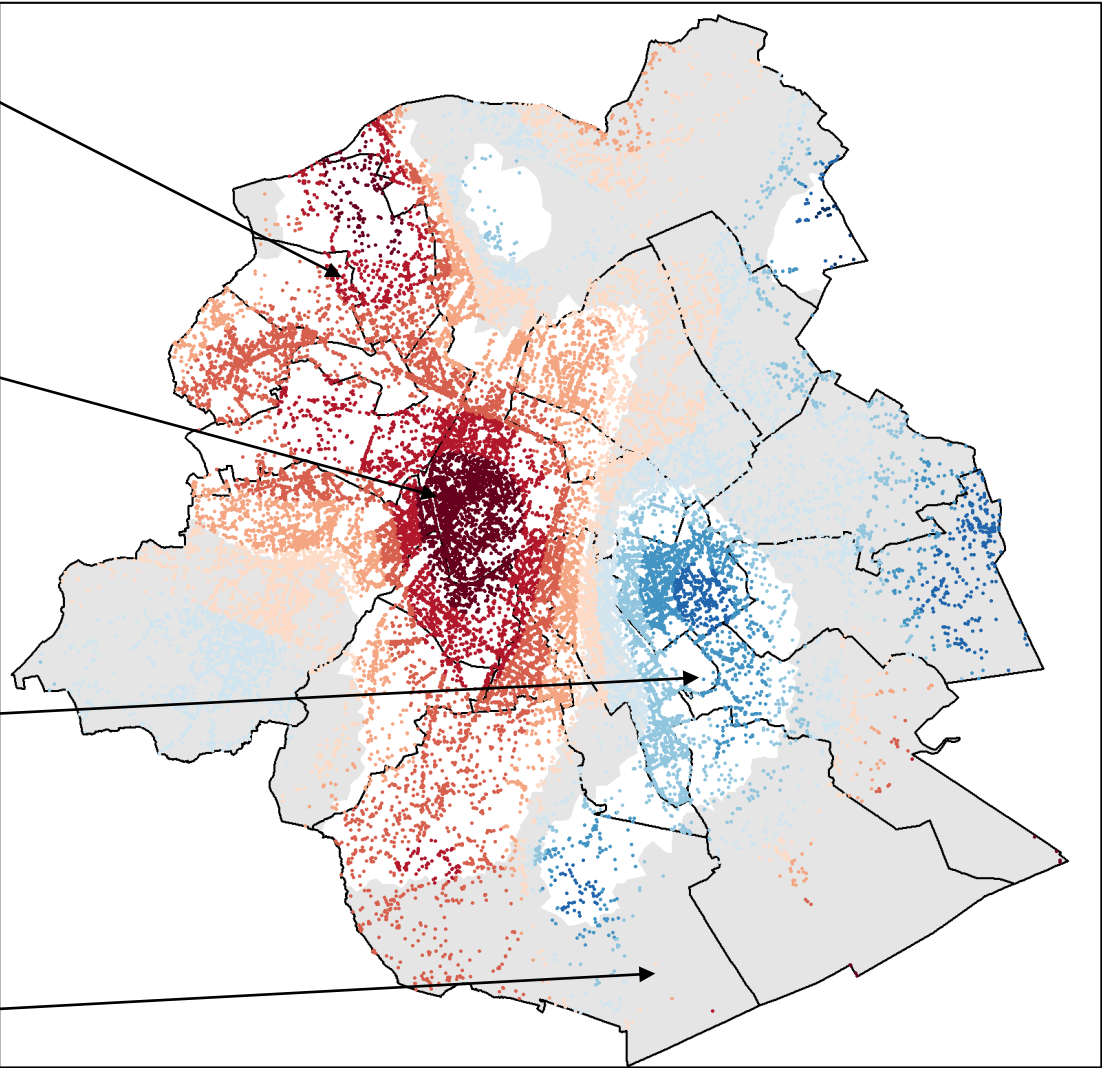
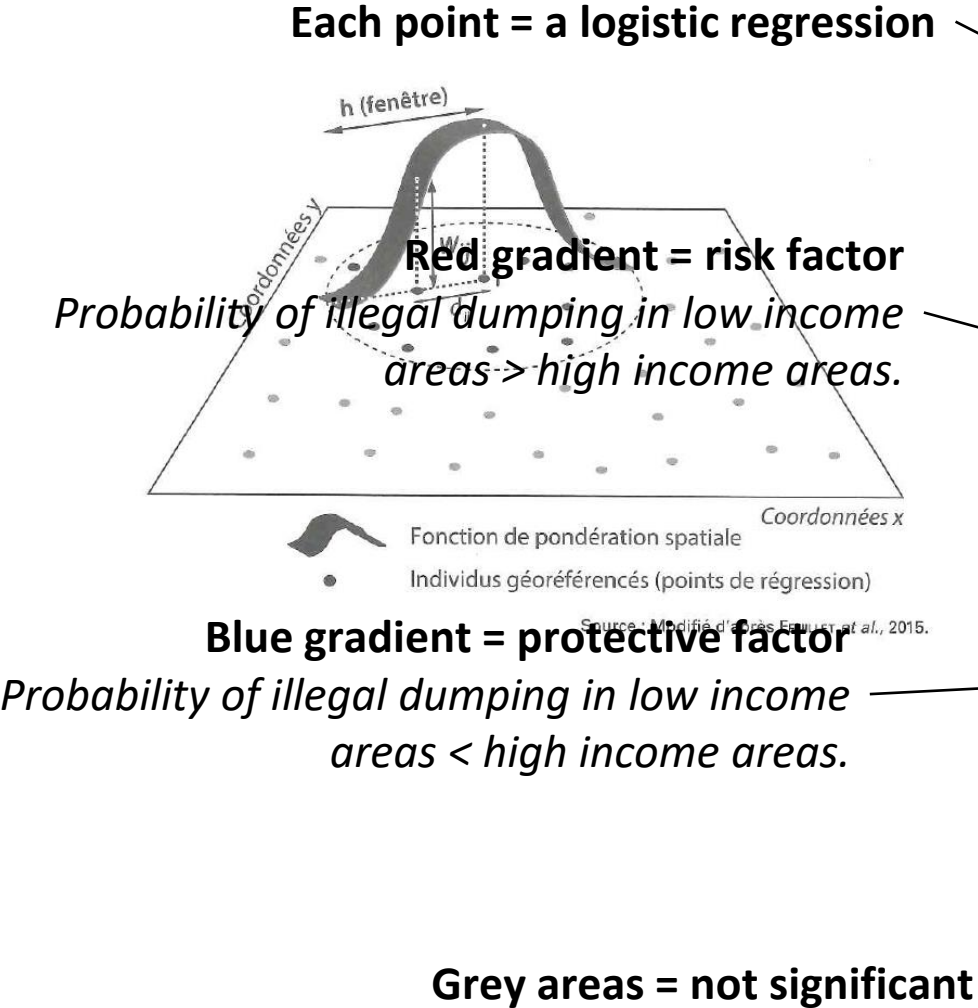
Source : Modifié d'après FEUILLET *et al.*, 2015.

$$w_{ij} = \exp \left(-\frac{1}{2} \left(\frac{d_{ij}}{h} \right)^2 \right)$$



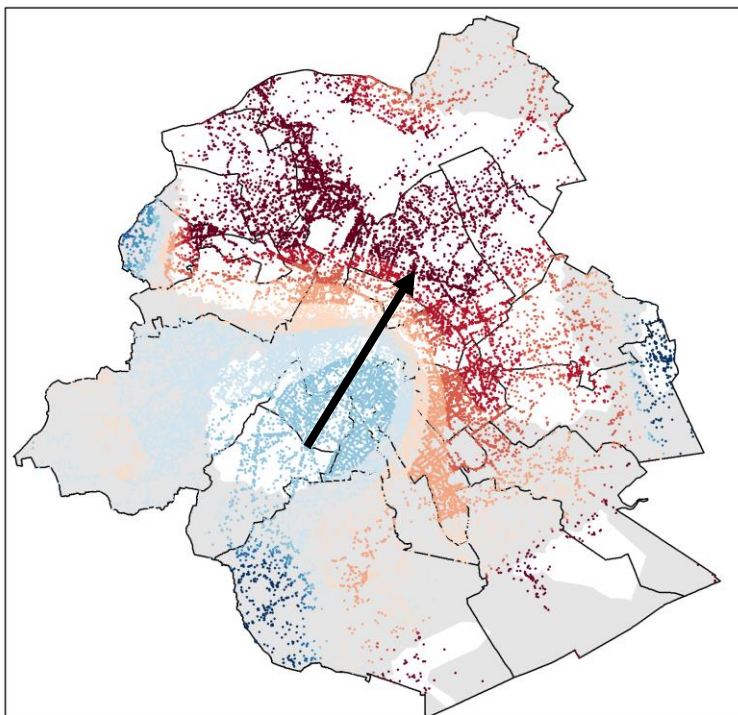
How to read the maps?

Odds ratio - Low vs. high income

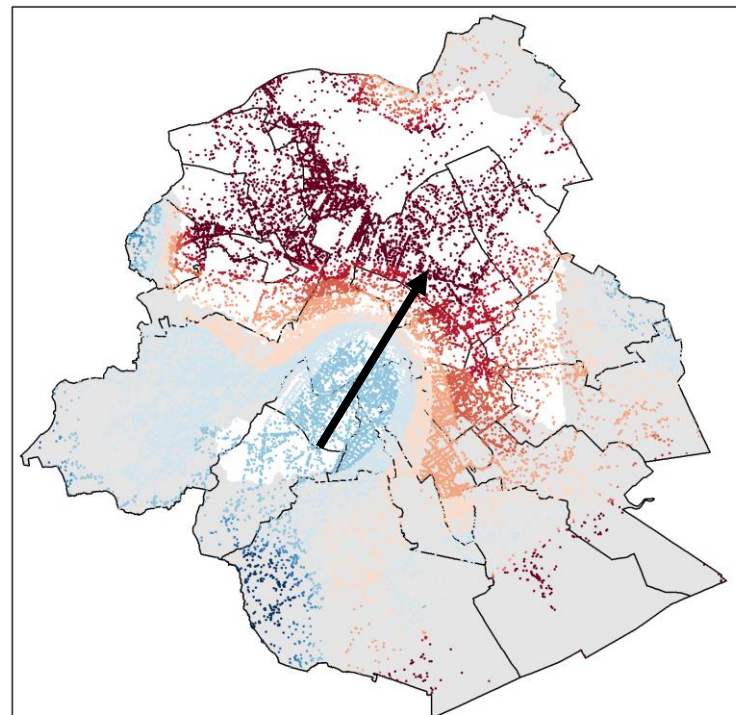


Vegetation

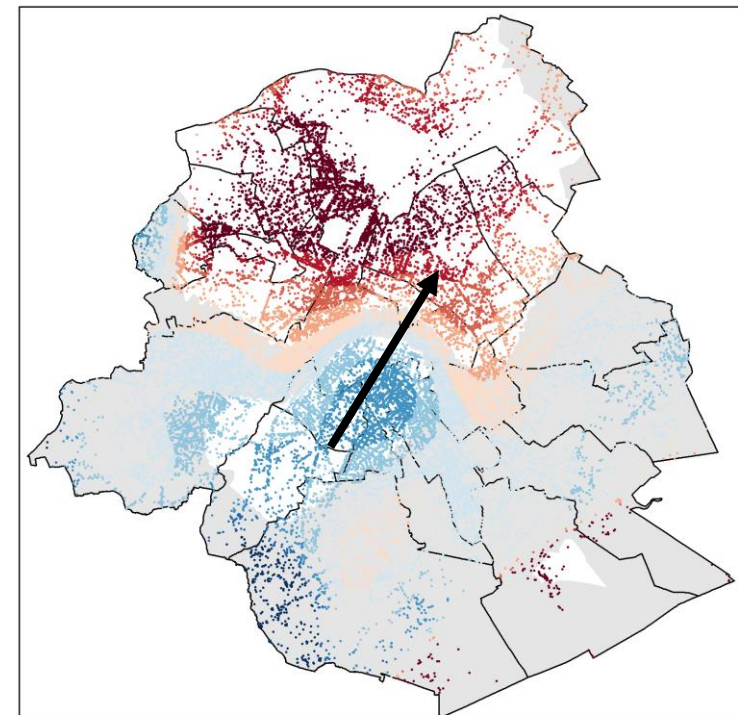
Low



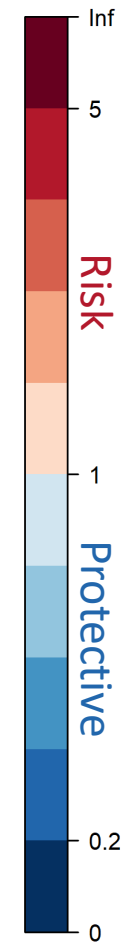
Medium



High



vs No vegetation

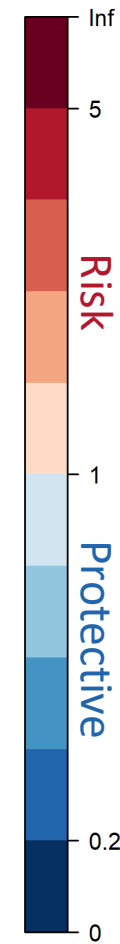
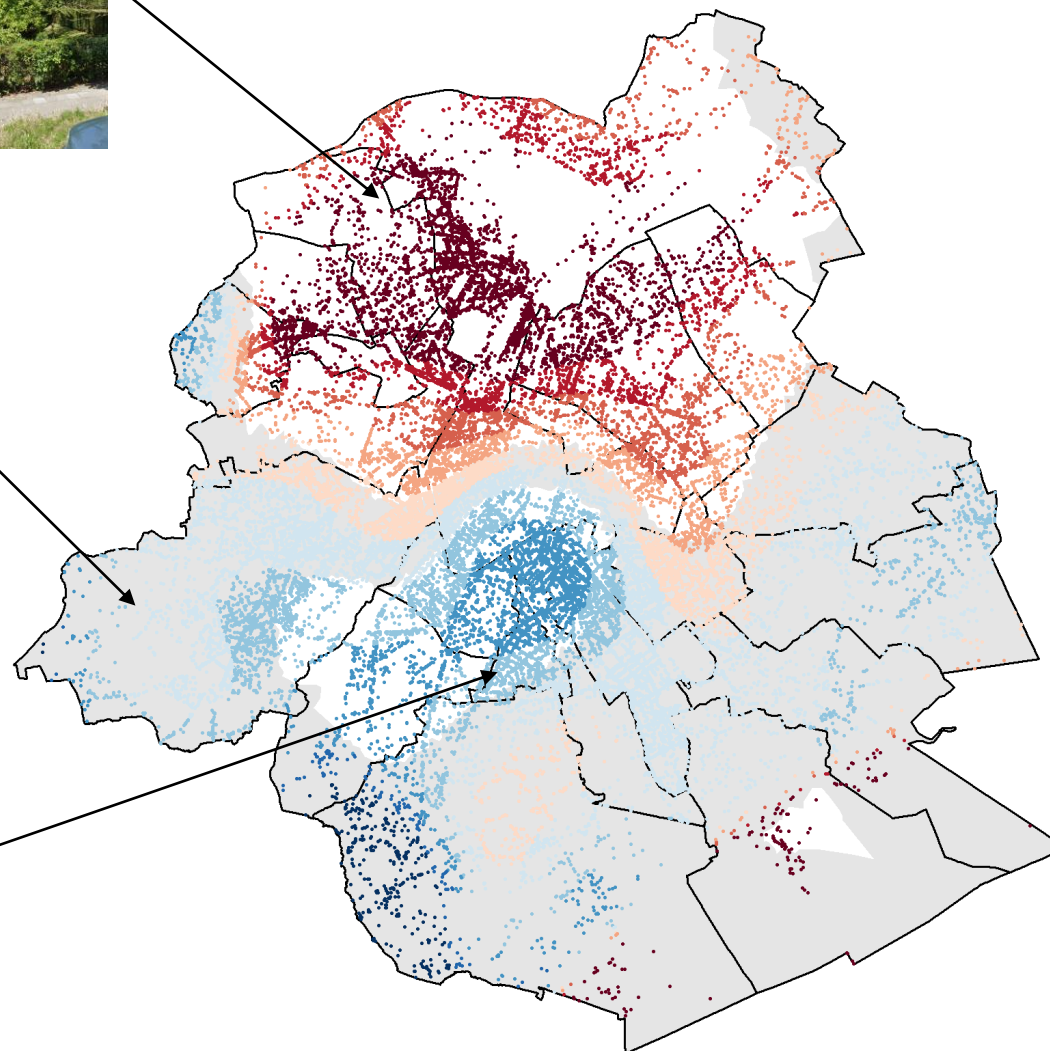


Not significant
Municipality

« Grands ensembles »



High vs. no vegetation

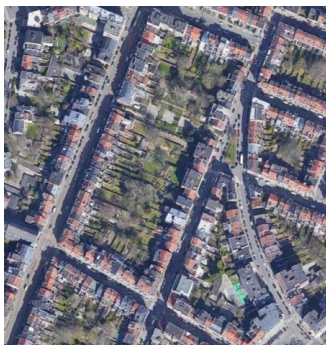


Not significant
Municipality

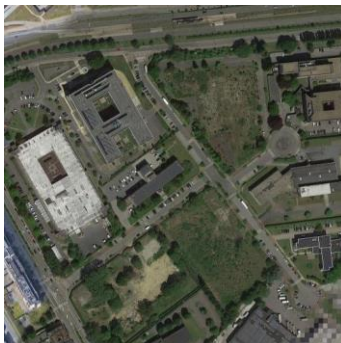
Agricultural area



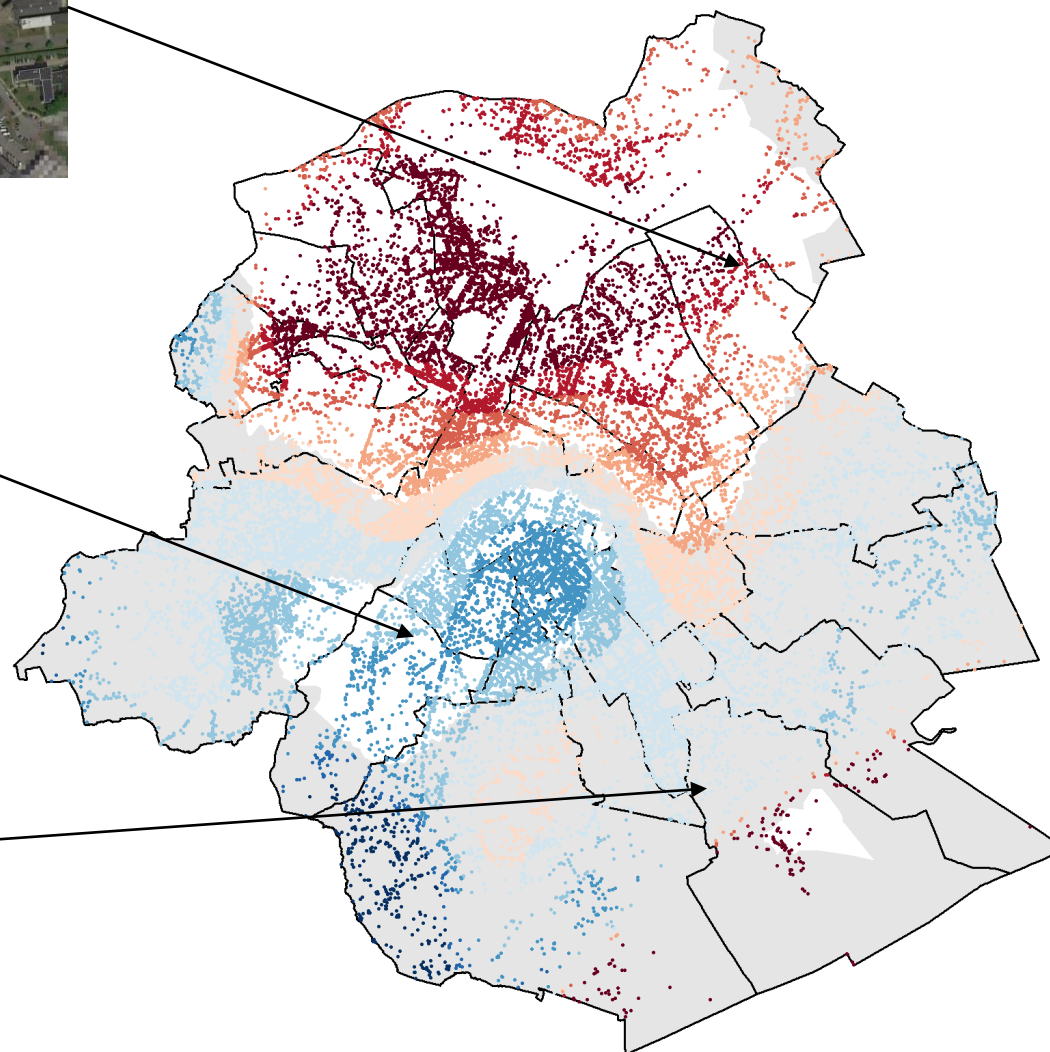
Home gardens



Industrial zone



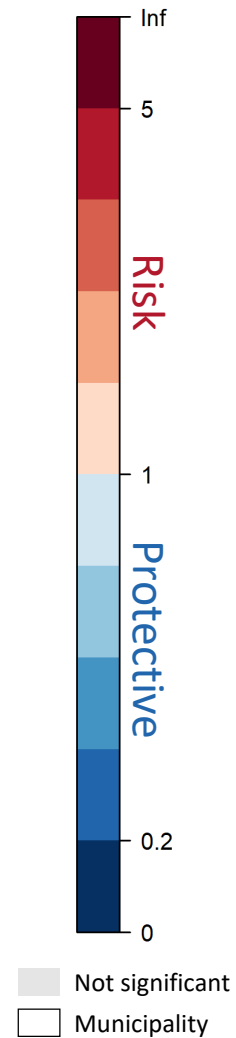
High vs. no vegetation



Urban park

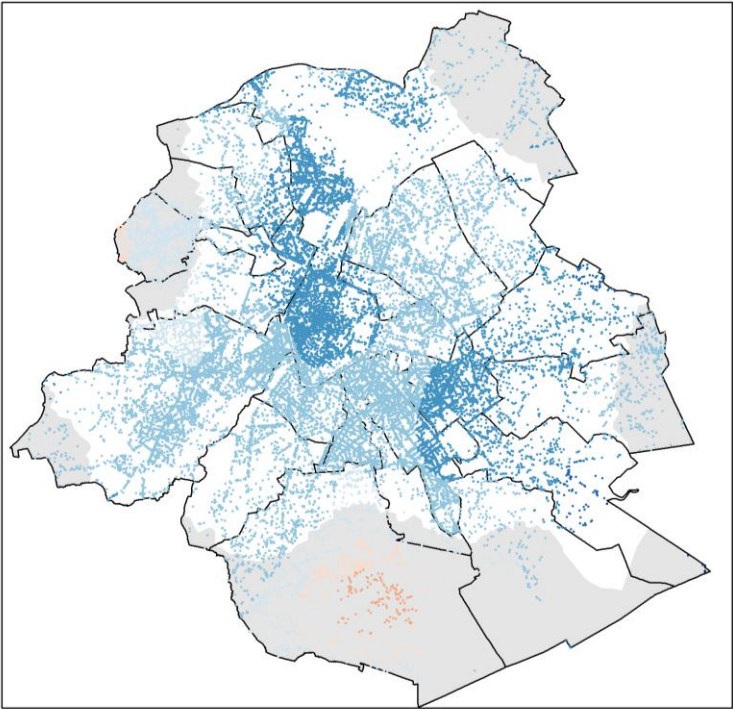


Urban forest

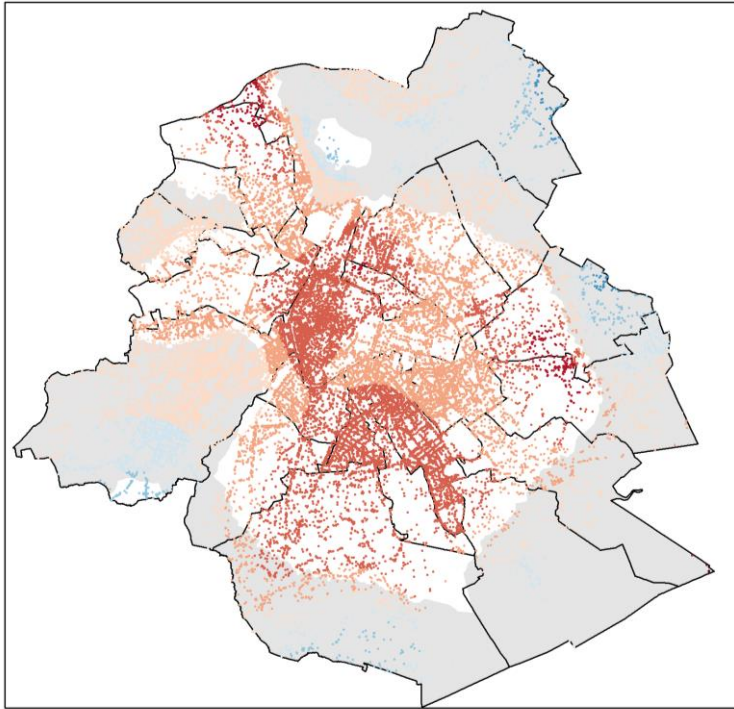


Stable variables

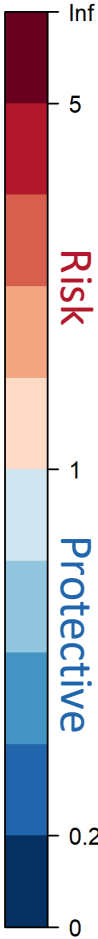
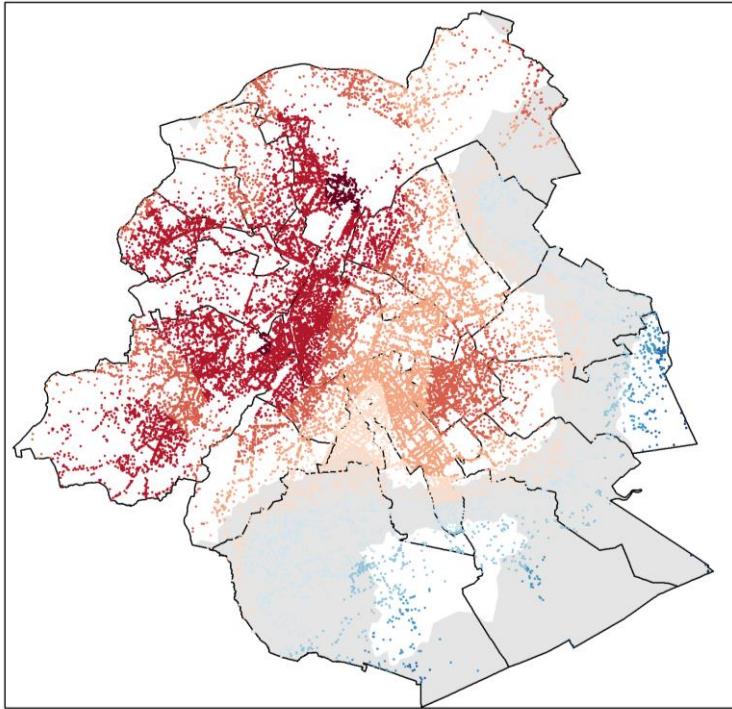
High vs. low **road noise**



Medium vs. high **income**



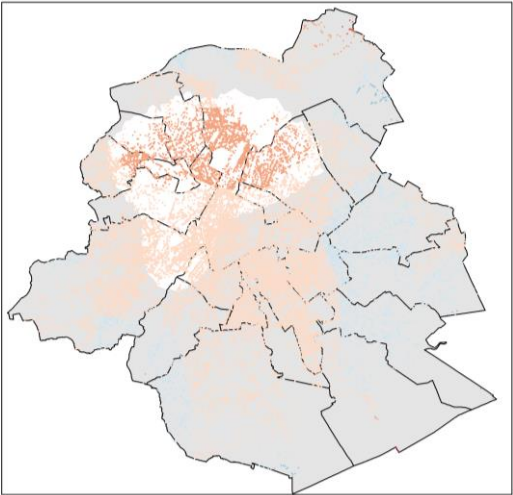
High vs. low **recurrence**



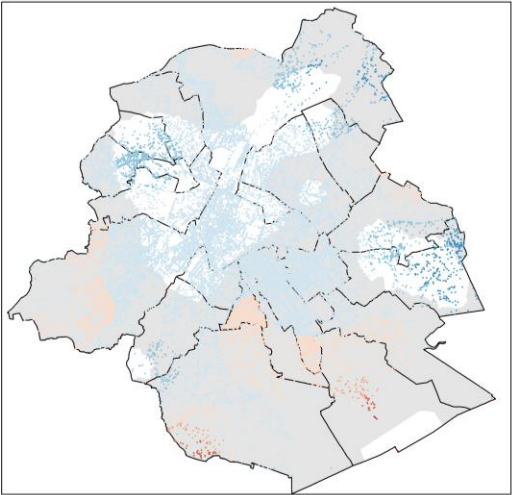
Not significant
Municipality

Relatively stable variables

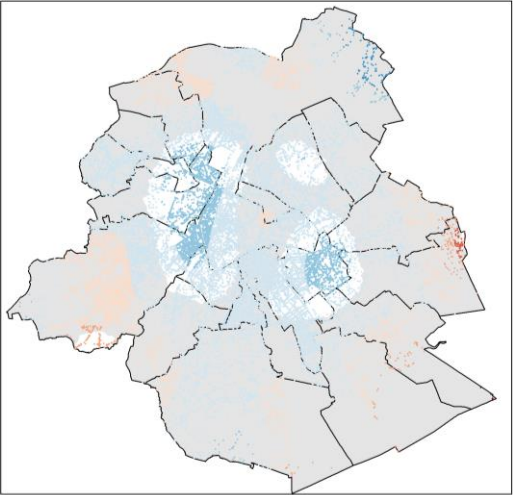
Tree presence vs. absence



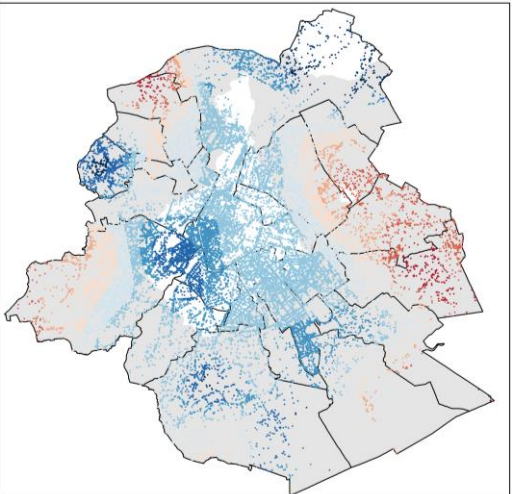
Shop presence vs. absence



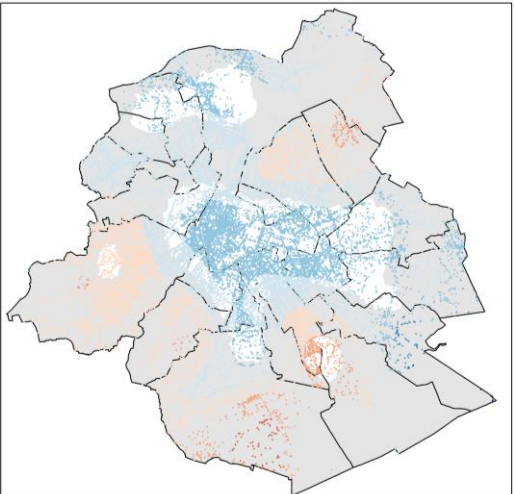
Large vs. narrow sidewalk



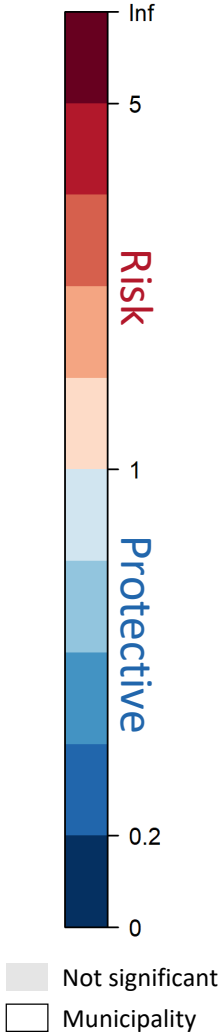
office vs. residential



industrial vs. residential



Land cover



Conclusion from an outcome perspective

- Robust findings
 - 🚗 Traffic (road noise) reduce illegal dumping => **social control**
 - 💰 Median income is inversely related to illegal dumping => **social deprivation**
 - ⚠️ Illegal dumping attract illegal dumping => **broken window effect**
- Findings
 - 🌳 Place under the tree create an **opportunity** for illegal dumping
 - 🛒 Shop protect from illegal dumping => **social control**
 - ↔ Large sidewalk protect from illegal dumping. Linked to pedestrian zone ?
More social control ?
 - 🏠 Residential area attract illegal dumping => **source**

Conclusion from a methodological perspective

- **Citizen as sensor**
 - ☺ Large volume of data
 - ☺ Zero cost
 - ☹ Data generated for another purpose
 - ☹ Not uniformly used across the region
- Comparison **method** avoids selection bias
- Result stable in time → **Reliable data**

Thank you for your attention!

Any questions?

Any comments?

Any suggestions?

Contact Information :

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madeleine.guyot@uclouvain.be