

Mapping socio-economic factors for environmental health studies in Wallonia: Transposition of the French Deprivation Index



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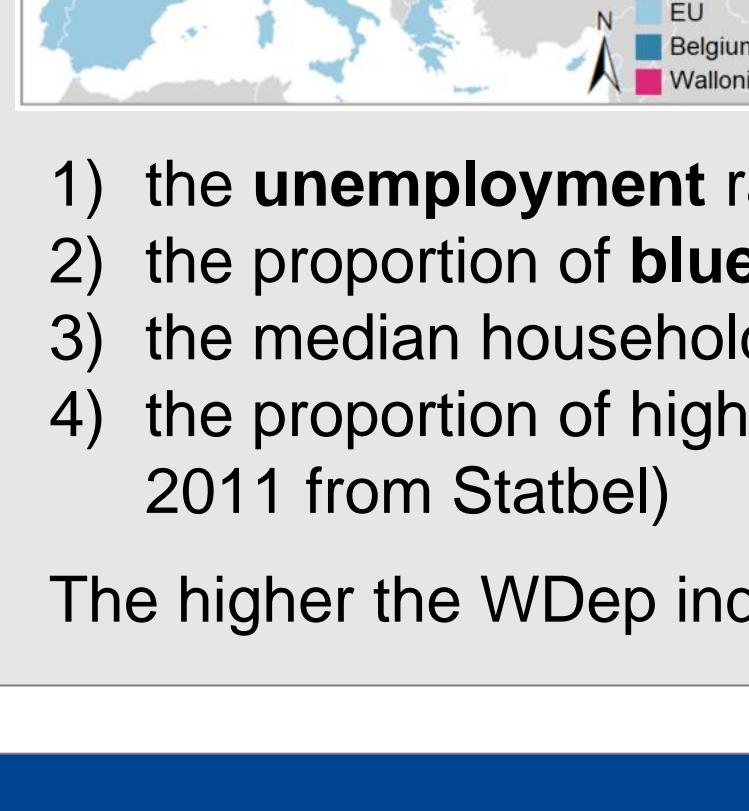
Key findings

Development of the Walloon Deprivation Index - WDep using open and reuse data to describe the socio-economic characteristics and spatio-temporal trends in Belgium with an easy and robust index

Background

Studying **social disparities** in health implies the ability to measure them accurately, to compare them between different areas and to follow trends over time. Some **composite indicators** to assess socio-economic factors in Belgium were developed in the past, but any update was not performed. Based on the method developed for the **social deprivation index** in France (the French Deprivation Index, FDep99¹), this work built a corresponding deprivation index in Wallonia, Belgium.

Materials and Methods



The deprivation index, 'WDep', was developed at the **municipalities level** in the southern part of Belgium

➤ Wallonia = 262 municipalities* ranging from 6.8 to 215.4 km²

* the smallest administrative subdivision of Belgium after the statistical sector

The index was built as the first component of a population-weighted principal component analysis of **4 socioeconomic variables** from the Belgian databases:

- 1) the **unemployment rate** (annual figures from IWEPS)
- 2) the proportion of **blue-collar workers** in the workforce (annual figures from ONSS)
- 3) the median household **income**, € (annual figures from Statbel)
- 4) the proportion of high school **graduates** in the population aged 15 and over (census 2011 from Statbel)

The higher the WDep index, the greater the level of deprivation.

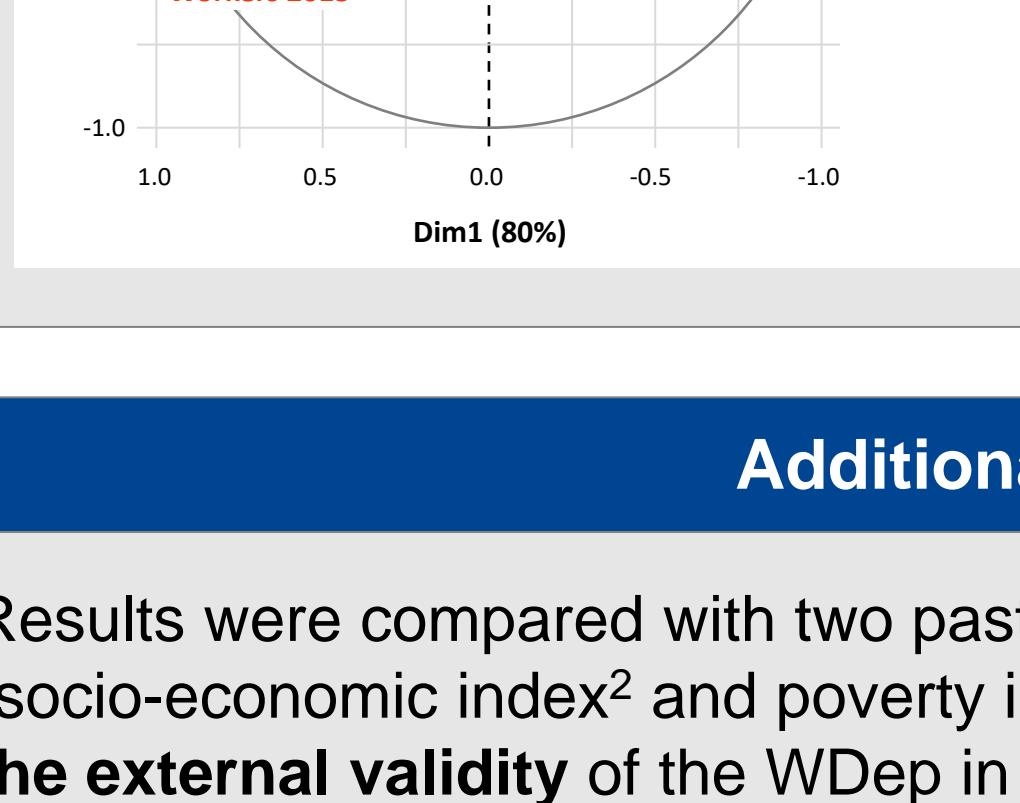
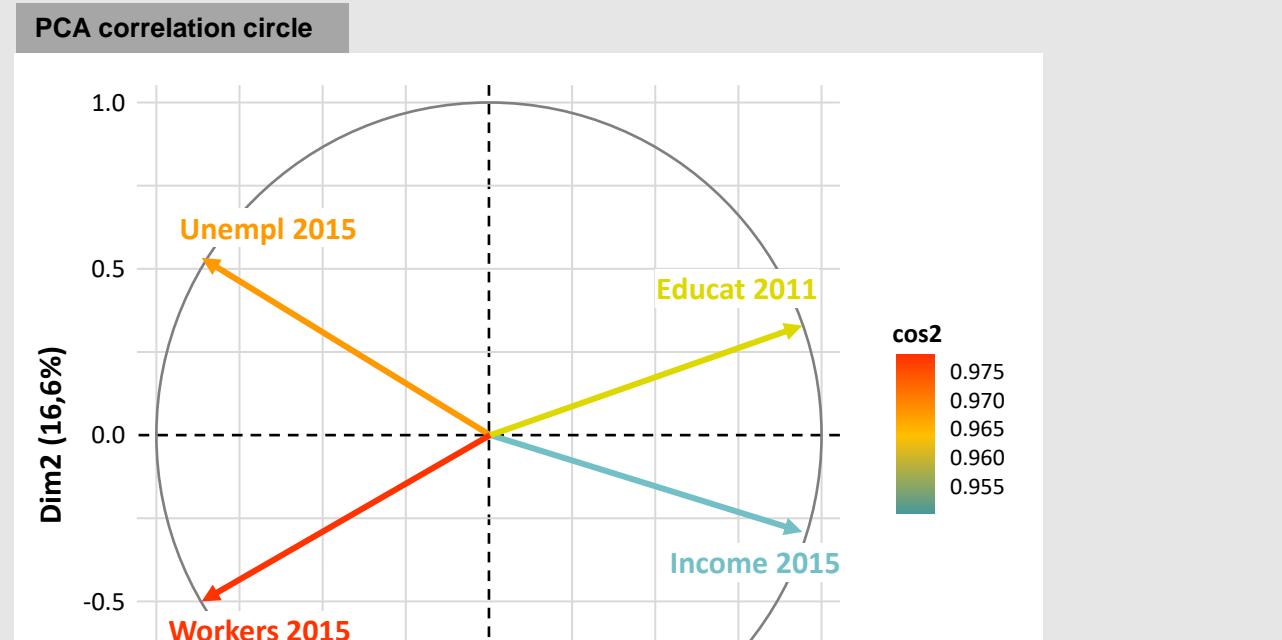
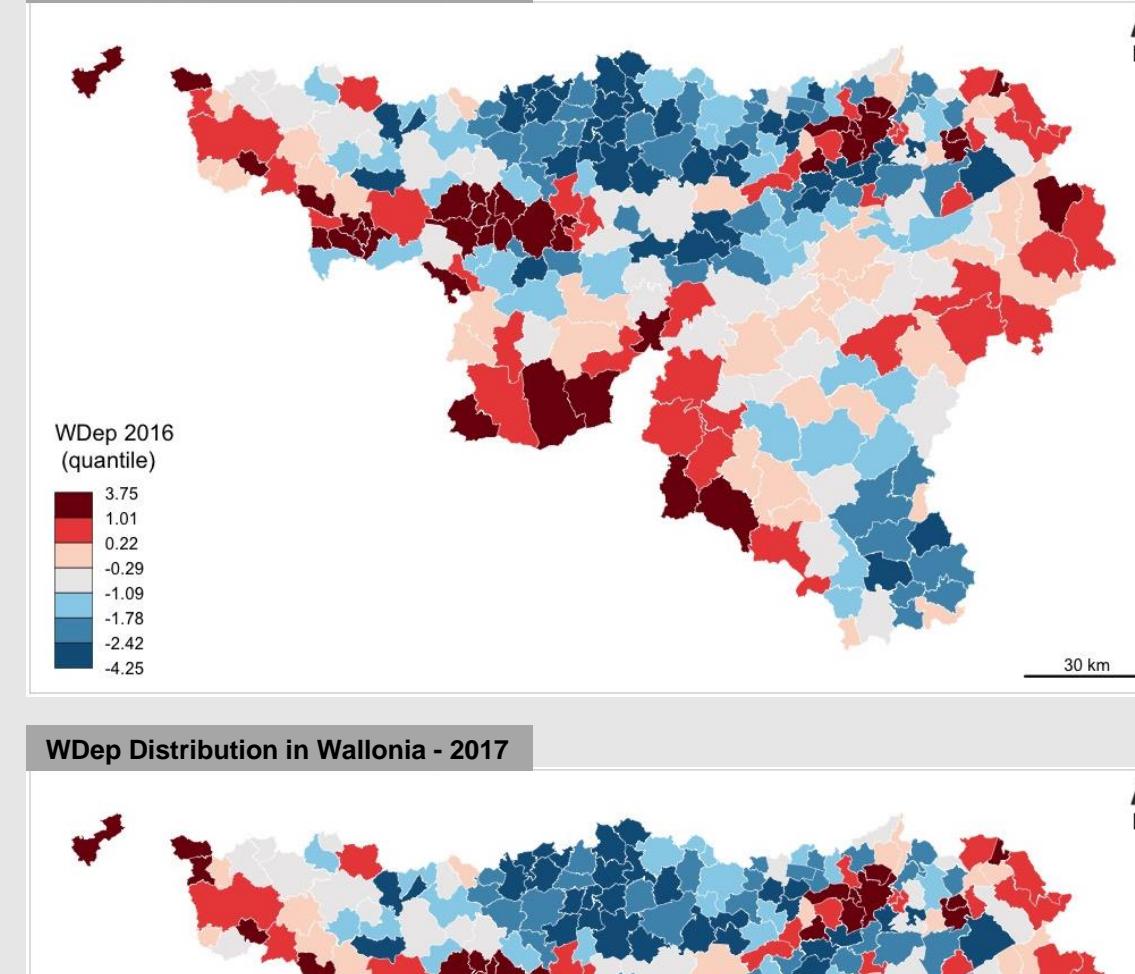
Results

➤ WDep index resulting of the first component of the PCA that explained 80% of the variance

➤ Maps of the WDep index by municipality built for 2015, 2016 and 2017

➤ Heterogeneous spatial distribution of the WDep over the territory of Wallonia

➤ Stable distribution over time (maps strongly correlated between years)



➤ Low index values reflect high median household incomes and higher education level in the population

➤ High index values reflect high unemployment rate and high % of blue-collar workers in the workforce

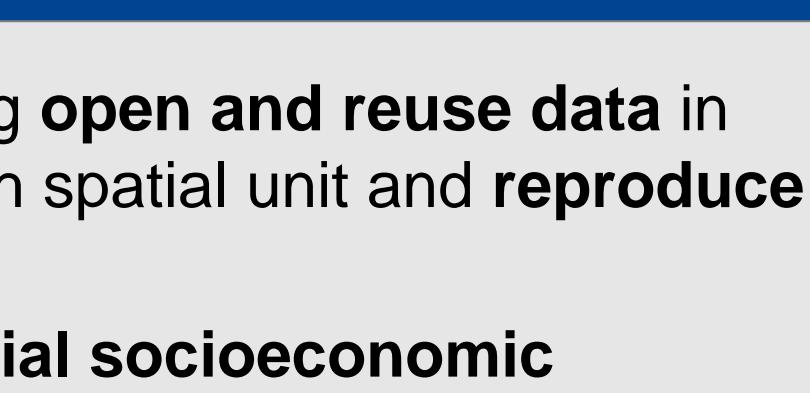
Additional Methods and Results

Results were compared with two past composite indicators (socio-economic index² and poverty index³) in order to **check the external validity** of the WDep in the **Walloon context**.

➤ The WDep is **highly correlated** to the two past indicators

Pearson's correlation coefficients and p-values

	2015	2016	2017
Socio-economic index	$r=-0.98, p<0.001$	$r=-0.98, p<0.001$	$r=-0.98, p<0.001$
Poverty index	$r=0.63, p<0.001$	$r=0.63, p<0.001$	$r=0.63, p<0.001$



Conclusions

- ✓ This work enabled building an **easy and robust index**, using **open and reuse data** in order to describe the socio-economic characteristics for each spatial unit and **reproduce it yearly**.
- ✓ The proposed deprivation index reflects a major part of **spatial socioeconomic heterogeneity**, in a homogeneous manner over the whole region.
- ✓ The index may be routinely **used by healthcare authorities** to observe, analyze, and manage **spatial health inequalities**.

References:

¹ Rey G, Jouglard E, et al. (2009). Ecological association between a deprivation index and mortality in France over the period 1997–2001: variations with spatial scale, degree of urbanicity, age, gender and cause of death. *BMC public health*, 9(1), 1-12.

² ULB-IGEAT (2016). *Etude POCICO - Rapport final: Pauvreté rurale et urbaine*.

³ ULB-IGEAT (2013). *Etude POCICO - Rapport final: Pauvreté rurale et urbaine*.

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