

NATURVATION
cities – nature – innovation



Valuation of urban NBS: application of benefit transfer method and lessons learnt

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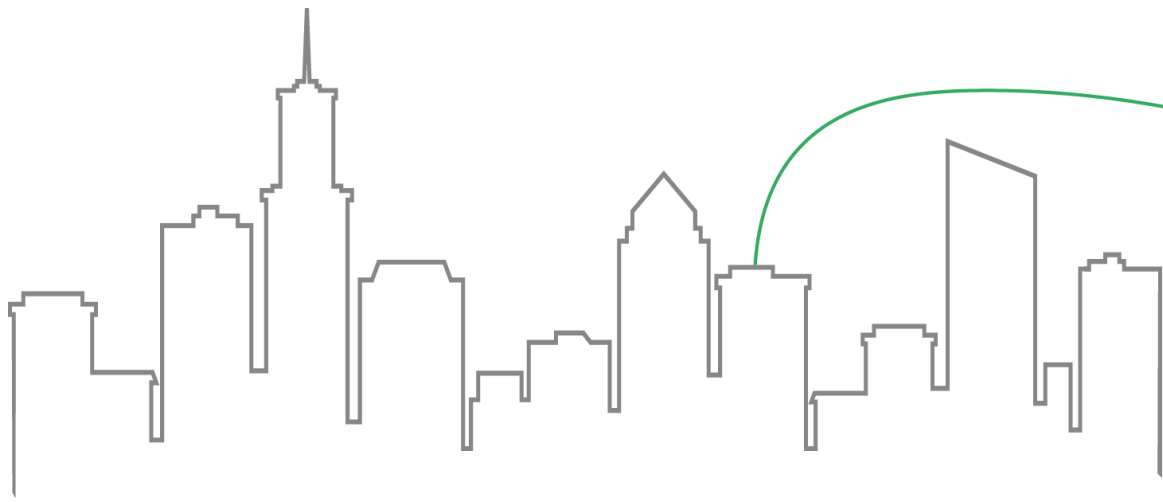
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Funded by the Horizon 2020
Framework Programme of
the European Union
Grant number 730243





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CONTEXT

METHOD

FINDINGS

CONCLUSIONS

CHALLENGES

SOLUTIONS



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CONTEXT

Economic valuation in H2020 NATURVATION project

1) Literature overview

- Economic values database

2) Methods for NBS assessment and NBSAF

- NBS assessment methods database
- Estimation of NBS value functions

3) Application of NBS value functions to assess NBS impacts

- European Urban Nature Atlas





METHOD

ECONOMIC VALUATION

METHODOLOGY:

Stated preferences

Revealed preferences

Benefit transfer

Benefit transfer method (BT)

FEATURES

- Uses primary valuation data / existing assessments
→ meta-analysis method
- Quantitatively analyses primary valuation data / existing assessments
→ Value transfer function (VTF)
- Enables applying VTF to a different location / context
→ obtain context & location specific values

ADVANTAGES

- Can be conducted relatively fast compared to primary valuation studies
- Based on up-to-date values and techniques from a variety of contexts, locations, nature types, ecosystem services, ...

DISADVANTAGES

- Aggregates data
- Depend on data from existing studies (e.g. NBS type)





METHOD

BENEFIT TRANSFER:

value transfer function specification

$$y_{ij} = \alpha + \beta^c X^c_{ij} + \beta^\alpha X^\alpha_{ij} + \beta^s X^s_{ij} + \mu_j + \varepsilon_{ij}$$

y_{ij} - the annual per hectare urban nature values (2016 EUR)

$\beta^c X^c_{ij}$ - socio-economic matrix

$\beta^\alpha X^\alpha_{ij}$ - study characteristics matrix

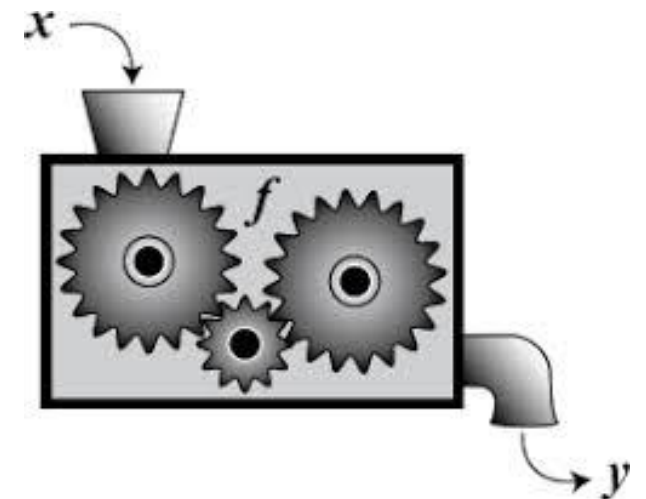
$\beta^s X^s_{ij}$ - site characteristics matrix

μ_j - residuals on the observation level

ε_{ij} - residuals on the author level

Mixed effect model;
multi-level model (MLM)

N=147





MAIN FINDINGS

BENEFIT TRANSFER:

results

- **Value transfer function (VTF) estimation:**

economic variables are associated with values of NBS in an expected way, namely:

- higher income per capita is associated with higher per ha NBS value
- higher urban density is associated with higher per ha NBS value
- bigger area of NBS is associated with lower per ha value of NBS

- **Types of urban nature:**

Urban parks is valued higher than an urban forest, blue nature or urban green connected to grey

- **Scale:**

VTF's based on **global data** and **European-only data** are estimated for various NBS types / ecological domains

Additional BTF's are being estimated with focus on area size.





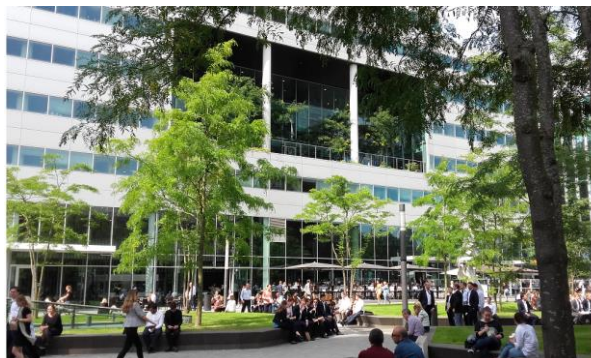
MAIN FINDINGS

BENEFIT TRANSFER:

estimation
results –
average values

	Average value in 2016 USD per ha per year	
	Global data	European data
<u>Type of nature:</u>		
Park	\$11,007	\$ 12,338
Green connected to grey	\$1,955	\$ 2,601
Blue	\$1,895	\$ 1,058
Forest	\$1,523	\$980
<u>Peri-urban areas</u>	\$1,187	\$980

Bockarjova, Botzen and Koetse (2018), submitted to journal



APPLICATION

BENEFIT TRANSFER:

European Urban Nature Atlas

The screenshot shows the website naturvation.eu/atlas. At the top, there is a navigation menu with links for HOME, ABOUT, CITIES, EXPLORE, SOLUTIONS, NEWS, and CONTACT. Below the menu is a large aerial photograph of a green urban area with the text "URBAN NATURE ATLAS" overlaid. To the left of the map is a section titled "ABOUT THE ATLAS" with the following text: "Welcome to the Urban Nature Atlas! It contains almost 1000 examples of Nature-Based Solutions from across 100 European cities. Use the Quick Search by icon (to the right of the map) or the Advanced Search (below the map) to identify the projects fitting your interests. The map will be updated to display the results of your search, and a list of all relevant projects is displayed below. Click on the title of projects for further information." To the right of the map is a section titled "QUICK SEARCH BY ICON" with three categories of filters: "KEY CHALLENGES" (including icons for CO2, star, building, bar chart, person, and leaf), "URBAN SETTING" (including icons for person, tree, water, and house), and "PROJECT COST" (represented by circles with 'C', 'CC', 'CCC', 'CC', 'EE', 'EEE', 'EE', and 'EEE'). The map shows various European cities with colored circles indicating project locations, such as Oslo, Stockholm, Berlin, London, Paris, Barcelona, and Rome.





MAIN FINDINGS

BENEFIT TRANSFER:

example – application of VTF to specific NBS

	Cordoba	Stockholm	Strasbourg	Athens
	<i>Asomadilla Park</i>	<i>The Royal National City Park</i>	<i>Danube Eco-District</i>	<i>Hellenikon Metropolitan Park</i>
Area (ha)	27	2700	1	200
GDP per capita (2016 USD)	25587	65853	37160	35653
Population density	260	3597	3500	7500
BTF application (European data)				
Value per ha per year (2016 USD)	\$509,194	\$46,336	\$33,527,530	\$251,865
Total value, per year (2016 USD)	\$13,748,234	\$125,107,874	\$33,527,530	\$50,372,975

INFLATED VALUES OF NBS WITH LOW ARE SIZE

Bockarjova, Botzen and Koetse (2018), submitted to journal





Meta-analysis of values of urban green and blue nature

CONCLUSIONS & REMARKS

ESTIMATION APPLICATION NEXT STEPS

CONCLUSIONS

- BT / meta-analysis is a useful tool to systematically analyse economic value of urban nature
→ meta-analysis method / VTF
- VTF applied to obtain economic value of actual NBS's
→ European Urban Nature ATLAS
- BT can be used at different scales
→ global / European

CHALLENGES / application

- NBS area sizes partially not available in Urban Nature Atlas
- Inflated values of small-size urban nature

SOLUTIONS

- Extra data search / approximation of area sizes
- Fine-tuning of VTF's for various area sizes
- Specify application procedure

