

Ecosystem service governance for urban sustainability:

Smart governance as an answer to heat islands in cities

Alfred Kaiser^{1,3}

Tatiana Kluvánková^{1,2,3}

¹ SPECTRA, Centre of Excellence EU

² Institute of Forest Ecology at Slovak Academy of Sciences

³ Institute of Management at Slovak University of Technology

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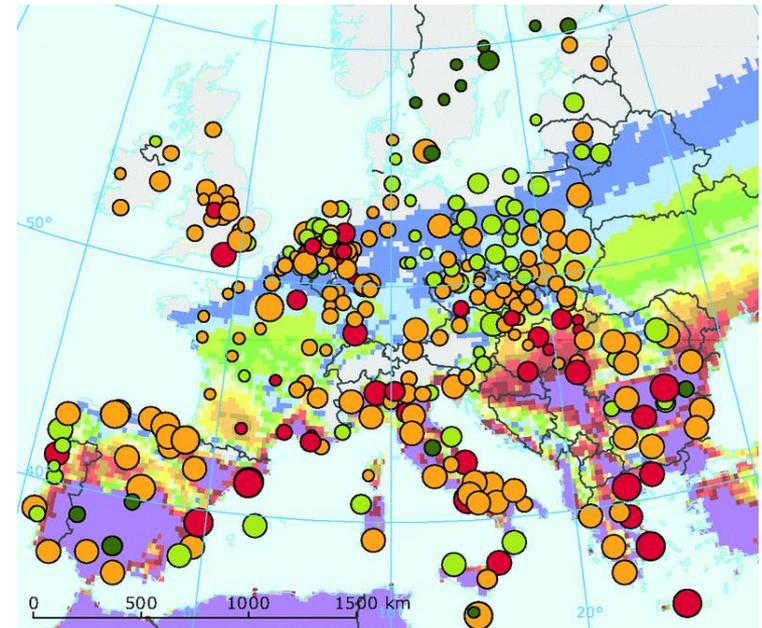


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STU

Climate change and cities

- Urbanization in Europe:
- today 72% , by 2020 80 % , 2100 90 % or more
- aging population,
- economic capital ↔ production of greenhouse gases,
- Resulting in: urban heat island



Heat waves — both a low share of green and blue urban areas and high population densities contribute potentially to the urban heat island in cities

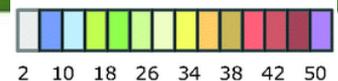
Population density per city (UMZ), 2004 (inh./km²)

- < 3 000
- 3 000–4 000
- 4 000–5 000
- 5 000–10 000
- > 10 000

Green/blue areas per city (UMZ), 2006 (%)

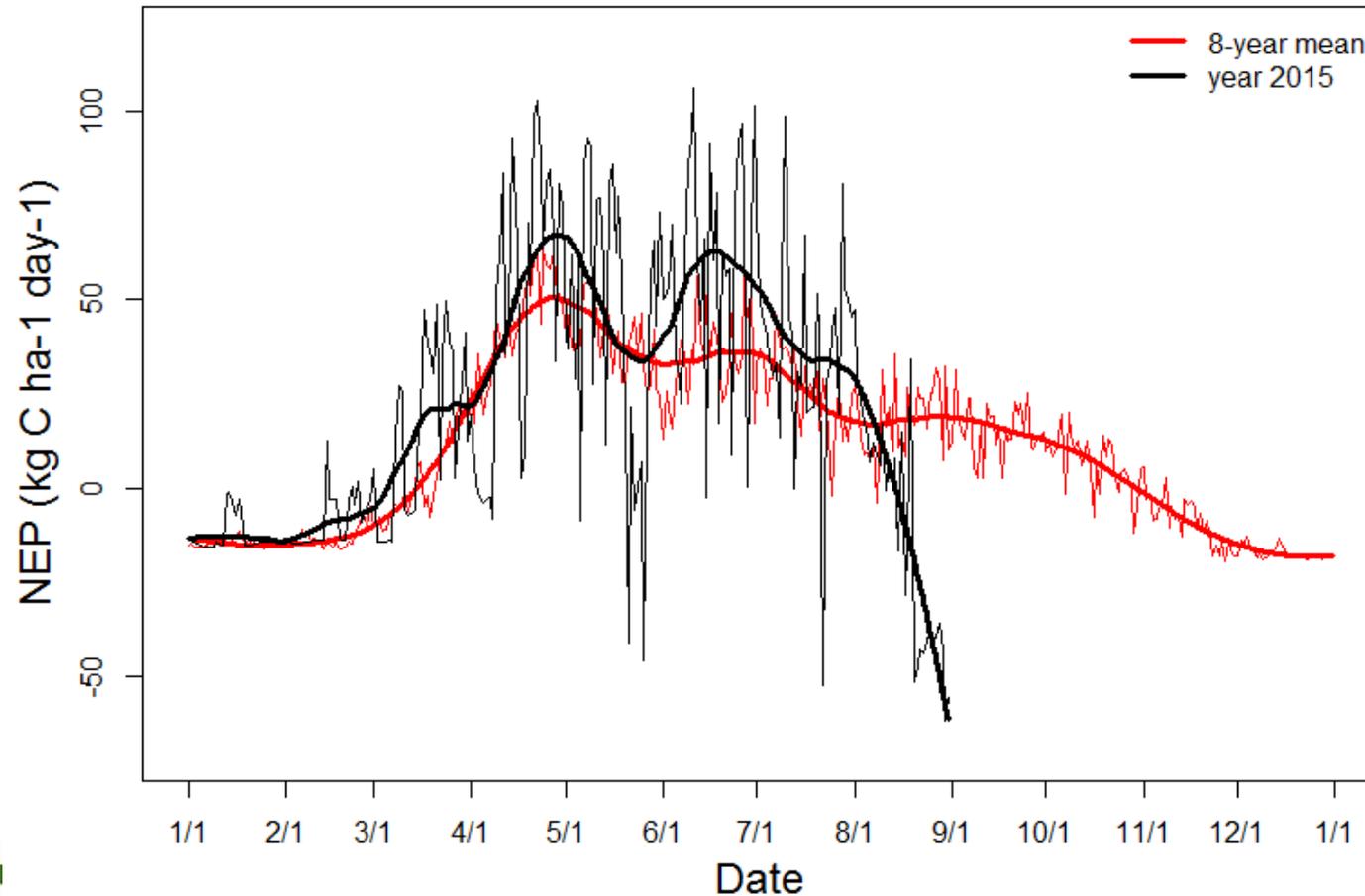
- ≥ 40
- 30–39
- 20–29
- < 20

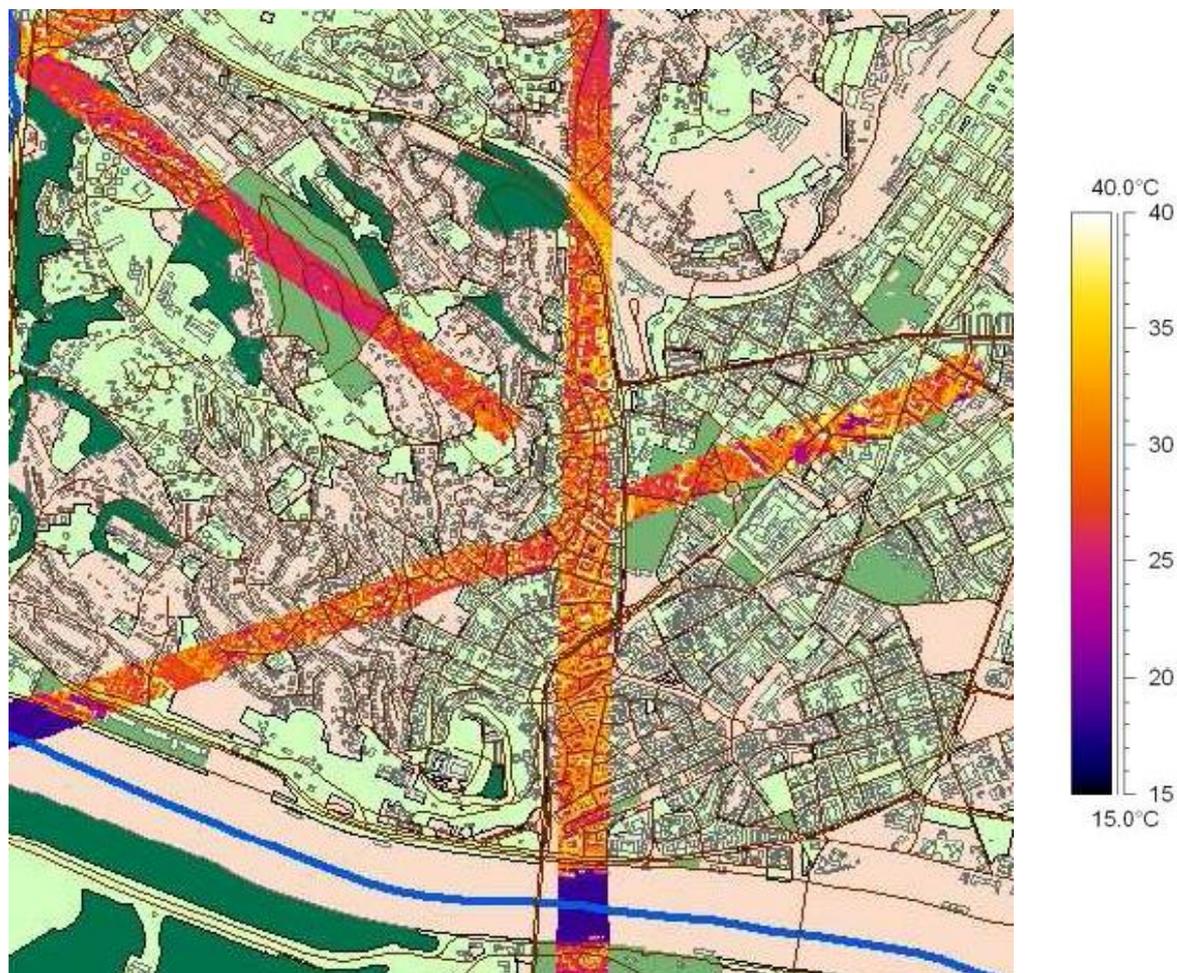
Number of combined tropical nights (> 20 °C) and hot day (> 35 °C), 2070–2100



Source: ec.europa.eu

Extremes in urban environment





Thermo vision images (in corridors) over Bratislava city centre during a hot summer day (Source: REC Slovensko, Fotomap, s.r.o, 2007)

Objective

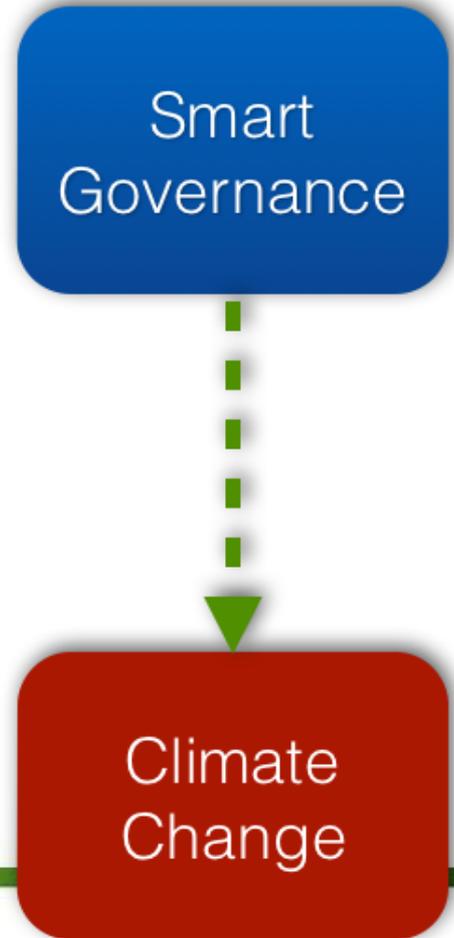
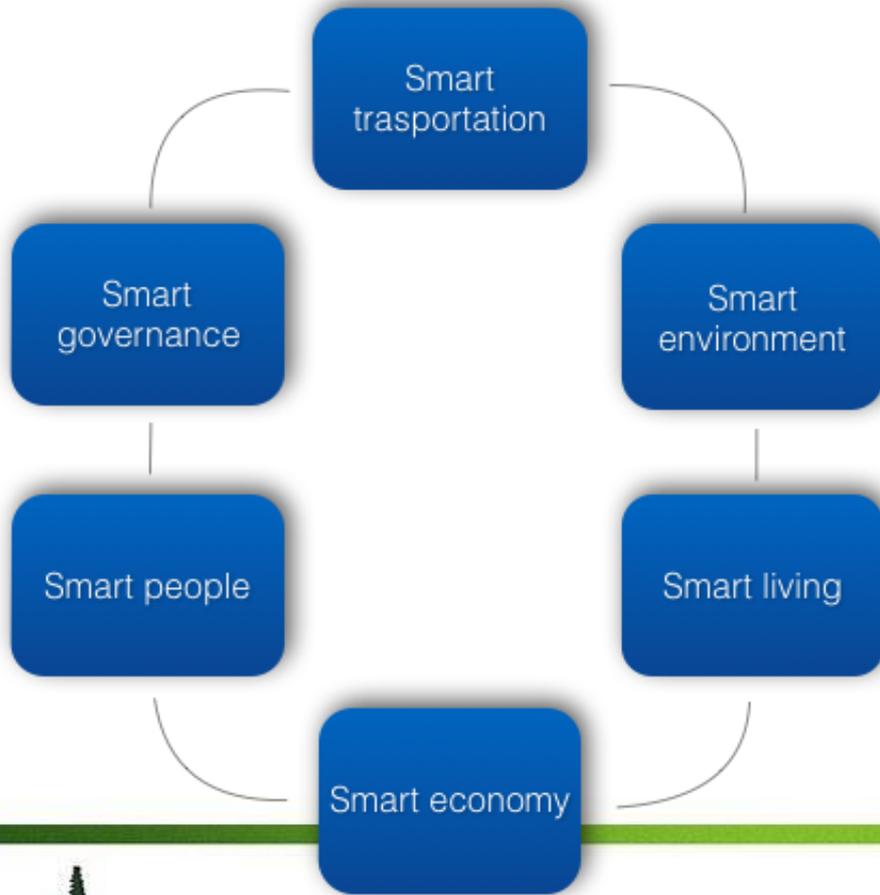
- Develop conceptual model of smart governance for urban climate mitigation (heat island effect mitigation)



Source: <http://iceconnect.eletsonline.com>

Basic Concept

Smart City



Smart Governance

- We will use concept of smart governance for mitigating climate change in cities under the multi-level governance conditions
- This concept will be focused on smaller areas



Definitions

Eger (1997)	sustaining old forms of governance are going to be replaced with new form which is called smart community so sustaining governance is changing into “smart governance”.
Mooji (2003)	smart should be moral, responsible for its actions, react on unforeseen circumstances, act according to moral rules and be transparent.
Willke (2007)	defines smart governance as a complex group of assumptions, aspects and capacities that consists a structure of governance which is capable to deal with circumstances and needs of modern community based on knowledge, information technologies and expertise.
Johnston & Hansenn (2011)	tool to participation and the way of collecting information from contributors because they are convinced that people want to contribute as an individual.
Janssen & Estevez (2013)	<u>concept of smart government which they call “I-Government”. Concept of I-Government is very interesting thanks to its innovation and more concentrated focus.</u>

Smart Governance

- Create a smart system that can be implemented into the management of urban spaces to mitigate climate in urban areas especially in semi-public spaces or inner blocks.



Relevance of green infrastructure in adaptation to climate change

- Green (and blue) infrastructure - policy tool mitigating the adverse effects of climate change



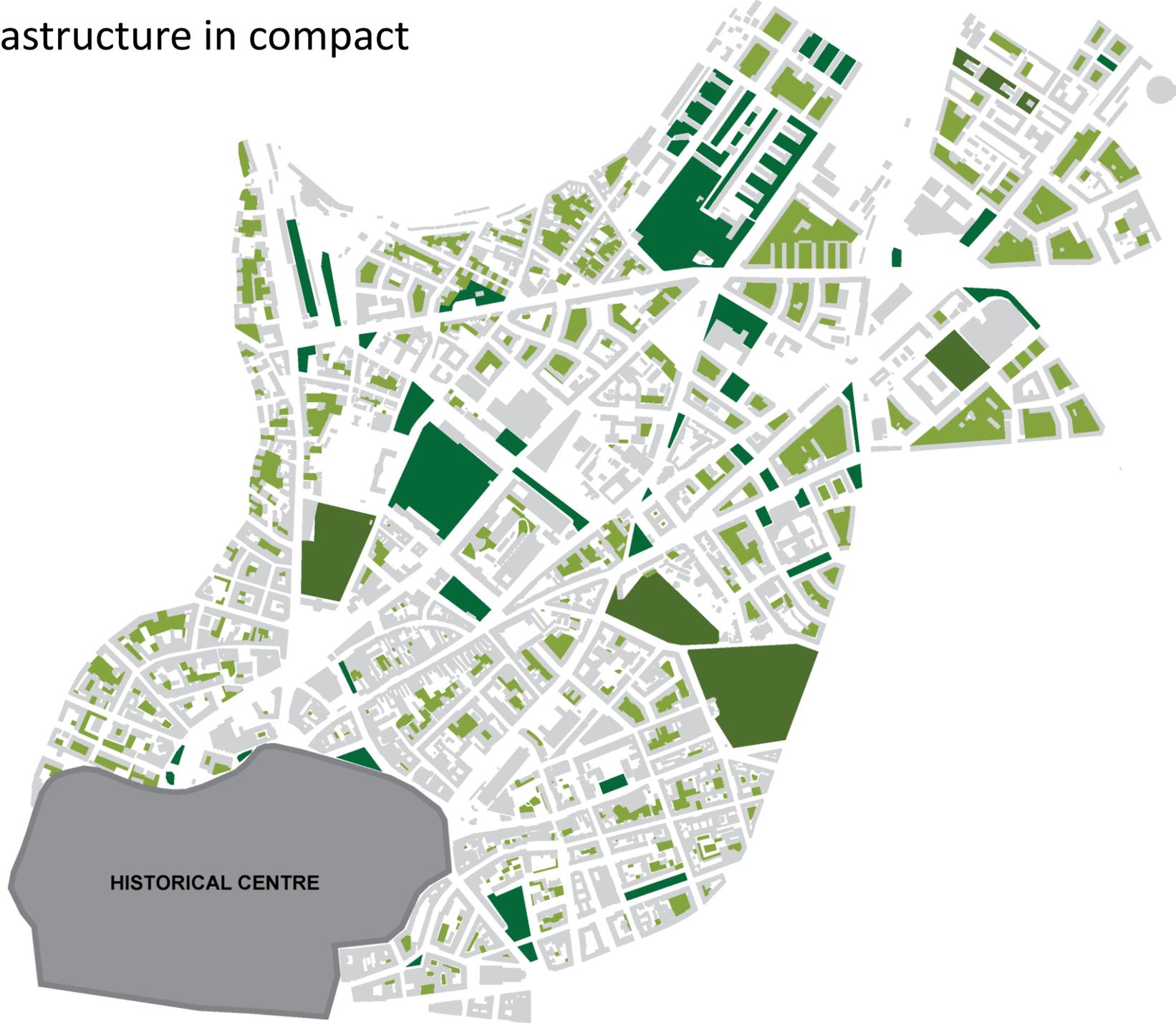
Green infrastructure in compact Bratislava – public access



Green infrastructure in compact Bratislava – semi-public access



Green infrastructure in compact Bratislava



Risk Perception to Climate Change: Methods

- **Comparative analysis** of risk perception and adaptive measures in urban environment (green infrastructure) in Slovak cities (Bratislava, Trnava, Ružomberok) (**semi structured interviews**) – with selected stakeholders
- Effect of green infrastructure: **empirical evidence**
 - Temperature and humidity measurements



Risk Perception

- **Czech Republic (similar climate in Slovak Republic)**
- Mostly concerned about greenery and and urban heat island (Pilsen floods)
- **United Kingdom**
- Mostly concerned about floods
- The research showed that there is need to focus on heat waves as well and researchers should focus on all aspects of climate change

Semi Structured Interviews

Risk perception (based on climate change)	
Heat waves and heat islands	Negative impact on human health, increasing risk of fires, increasing of energy consumption (air conditioning, cooling systems), ...
Drought and water scarcity	Water scarcity, drying of vegetation, deterioration of air quality (dust)
Lack of infiltration of rainwater	Poor drainage conditions in cities, impermeable surfaces
Flood risk	Increase river flooding, thread on human lives, damage to infrastructure, property, plant and environment, soil erosion and landslides,...

Semi Structured Interviews

Adaptation measures (on following elements)	
Heat waves and heat islands	Magnification, revitalizing of green spaces in cities, green roofs, green facades, blue infrastructure (water), urban gardening
Drought and water scarcity	Revitalization possibilities of rivers and river branches, creation of new branches, ponds and wetlands,...
Lack of infiltration of rainwater	Reduce the extent of areas with impermeable surfaces
Flood risk	Capture and use of rainwater

Scoreboard of Importance of a Risk

1 - very significant risk
2 - rather significant risk
3 - rather insignificant risk
4 - an insignificant risk
5 - negligible risk

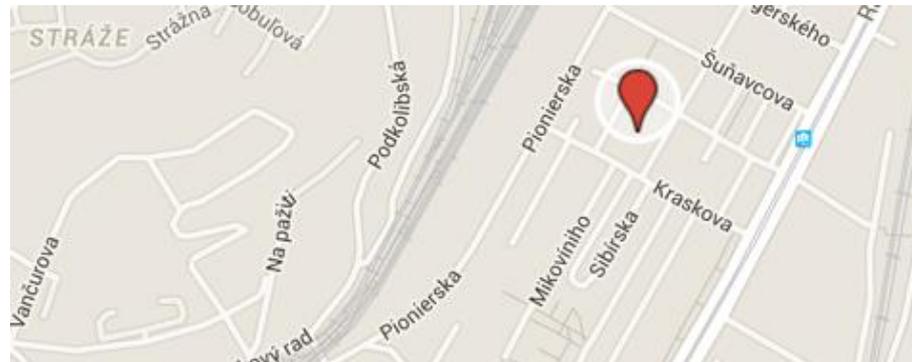
Feasibility of adaptation measures

- Expert assessment:
 - How do you see the effectiveness of adaptation measures, you know?
 - Political continuity / public support for adaptation measures
 - Implementation of measures in cooperation with various actors (co-financing and co-operation)



Measurement

- Temperature and humidity (Bratislava)



Expected Benefits

- Improvement of environment in cities
- Better communication with authorities
- Climate change mitigation in cities
- Possible adaptation in various urban spaces



Thank you for your attention

Questions and remarks are welcome:
fredokaiser@gmail.com



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