



TAKING  
**COOPERATION**  
FORWARD



DLA Conference, Dessau - 24.05.2018



**GIS-based landscape assessment for the Salzburg FUA**



Günter Gruber, Johanna Schmitt

RSA FG maintains 6 research studios in Austria with focus on:

data science, pervasive computing, smart agent technologies, mobile learning and 4D environments

- Multi-level project chains
- Knowledge transfer and incubator role
- Capitalizing scientific knowledge in the market

Studio iSPACE is specialized on georeferenced solutions:

- Up-to-date GIS methods and technology-driven expertise in
  - data management & processing
  - spatial analysis & simulation
  - indicator systems
  - cartography & geo-visualisation
- Applied planning and decision-support for an integrative **smart settlement development**

## Cooperative applied research projects

Innovations | Strategies & Visions | Region and EU | Stakeholder Involvement

## Smart Settlement Systems

Spatial indicators | GIS-based analysis and modelling | Simulation tools |  
Monitoring for more liveable cities and regions



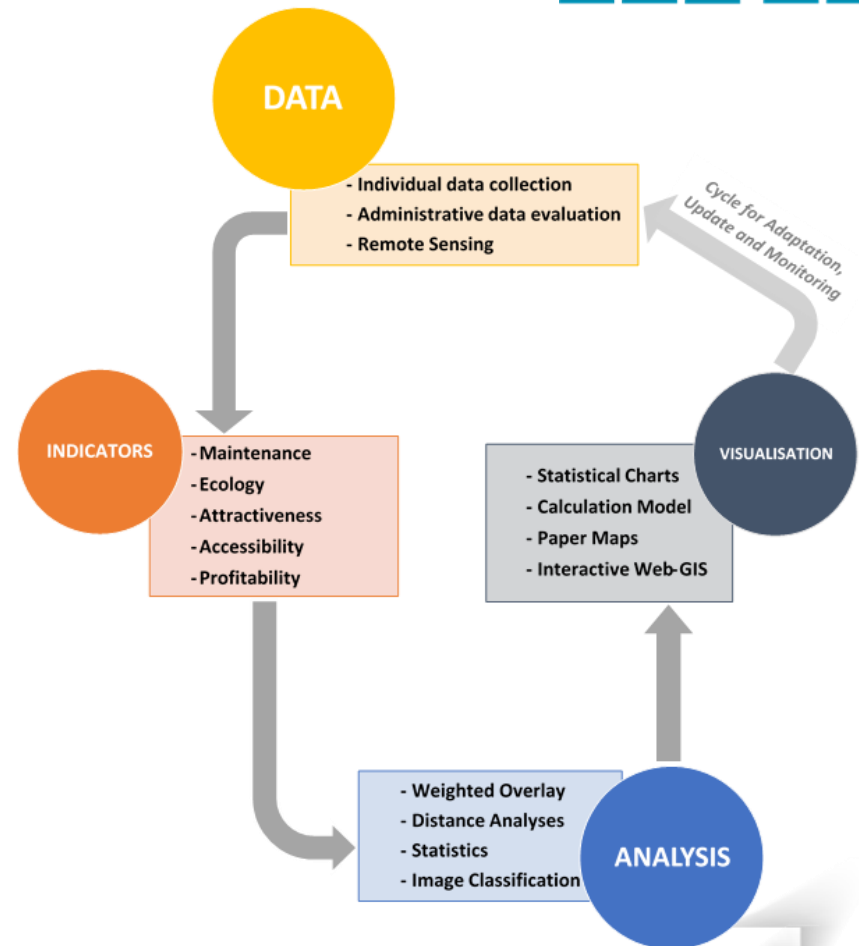
# PROJECT URBAN GREEN BELTS

- **Goal:** Development and pilot testing of innovative methods and tools for smart management of green spaces in functional urban areas
- 10 project partners from 7 central European countries
- Development of **Smart Models** in 3 thematic working groups:
  1. GIS-based solutions (iSPACE as knowledge provider)
  2. Community involvement
  3. Multi-stakeholder governance
- Design of local **roadmaps** and a joint **Smart Governance Manual** on integrated urban green space management as a guideline for local authorities



# CONCEPTS OF THE GIS MODEL

- **Analytic vision**
  - Identify local assets and demands
  - Define specific objectives with respect to local development strategies and stakeholder interests
- **Appropriate indicators**
  - Crack up complex real-world phenomena and make them measurable
- **GIS workflow**
  - Data acquisition and management for *transferability*
  - Analytic methods and processing routines for *replicability*
  - Visualisation techniques for *communication* purposes



# ANALYTIC PILLARS AND INDICES

**R S A F G**

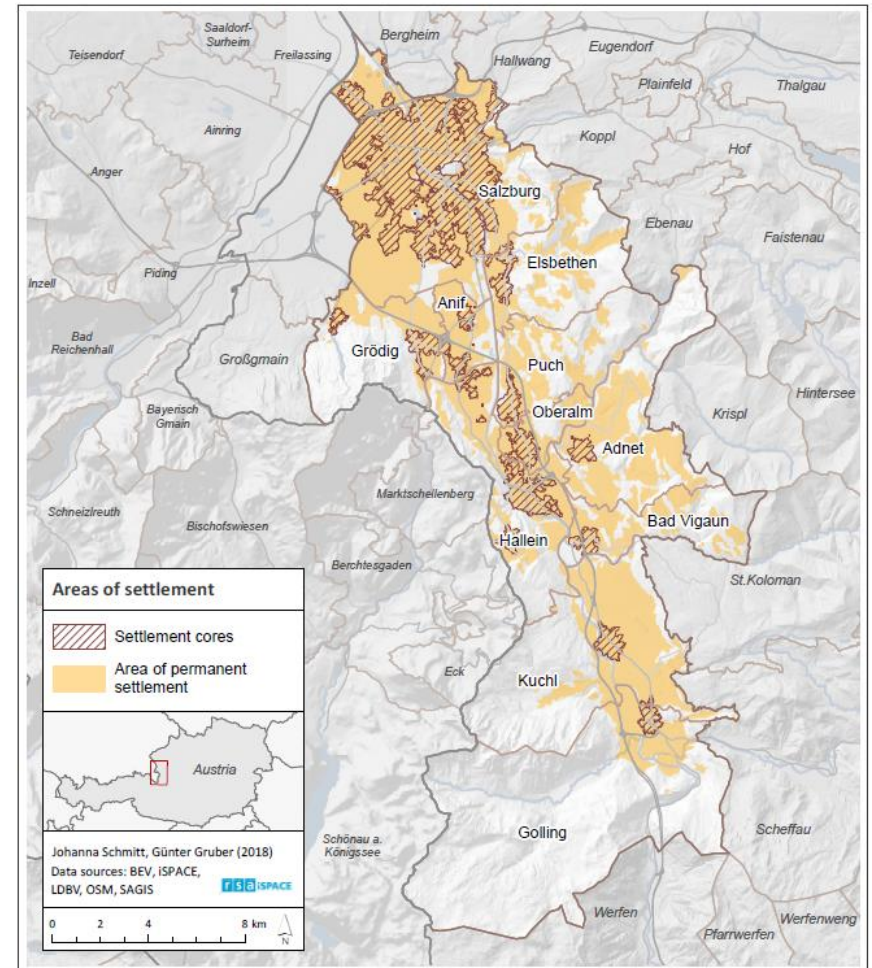
	Maintenance	Sustainability	Attractiveness	Profitability	Fair Supply
Dimension	Inventory of various green space types and deduction of effort and costs for conservation	Support of a well-balanced supply of natural green space functions	Configuration and satisfaction of users as contribution to liveability	Economic potential in terms of agriculture & forestry and tourism	Balanced fulfillment of the demand for green space services
Targets	Monitoring and management support for public authorities	Analysis of natural functions for authorities and ecologists	Acceptance studies for planners and socio-psychologists	Capitalization options for developers and business people	Demand and competition analyses for regional planners and developers
Implementations in Salzburg	Data on green space inventory only used as input for other analytical steps	<b>Landscape Index</b>	<b>Recreational Index</b>	Identification of high quality soils and productive forests for cultivation	<b>Near-distance supply of high quality green with residents</b>  <b>Matrix to identify priority and potential conflict zones</b>
		<ul style="list-style-type: none"> <li>- relief diversity</li> <li>- existence of water</li> <li>- tree cover density</li> <li>- land cover status</li> <li>- share of protected areas</li> <li>- biotopes</li> <li>- noise zones</li> <li>- wildlife corridors</li> <li>- attractive forests</li> </ul>	<ul style="list-style-type: none"> <li>- path density</li> <li>- number and variety of infrastructural elements like               <ul style="list-style-type: none"> <li>• playgrounds</li> <li>• sports fields</li> <li>• picnic sites</li> </ul> </li> </ul> <p>To be complemented by users' perceptions</p>		





## The Upper Salzach Valley:

- Part of the Salzburg FUA
- Dominated by river Salzach and alpine topography → small area of permanent settlement
- Urban core and rural surroundings
- Population: 218.000
- High population pressure in the Salzburg Basin
- 77% covered with green, mainly forests and agricultural land



## Objective 1: Monitoring of green space quality

- ✓ Action 1.1: Assessment of green space quality in terms of recreational value
- ✓ Action 1.2: Assessment of green space quality in terms of landscape value
- ★ Action 1.3: Green space surveys

## Objective 2: Improvement of green space supply

- ✓ Action 2.1: Determination of green space supply in short walking distance
- ★ Action 2.2: Remodeling of green spaces to raise the supply with high quality green

## Objective 3: Well-balanced distribution of green

- ✓ Action 3.1: Identification of development and conflict zones
- ★ ✓ Action 3.2: Prioritization of areas and conflict handling

## Objective 4: Awareness raising

- ★ Action 4.1: Organization of green events with result communication



## Example: Recreational Index

	Indicators	Classification and normalization	Indicator weight
Recreational Index	Path density [m/ha] (I <sub>1</sub> )	0 (1 point) >0-200 >200-400 >400-800 >800 (5 points)	0.4
	Number of different categories of infrastructural elements [n] (I <sub>2</sub> )	0 (1 point) 1-3 4-6 7-9 >9 (5 points)	0.3
	Presence of sports fields, playgrounds, picnic sites [yes/no] (I <sub>3</sub> )	Not present (1 point) Present (5 Points)	0.3

$$\text{Recreational Index} = (0.4 * I_1) + (0.3 * I_2) + (0.3 * I_3)$$

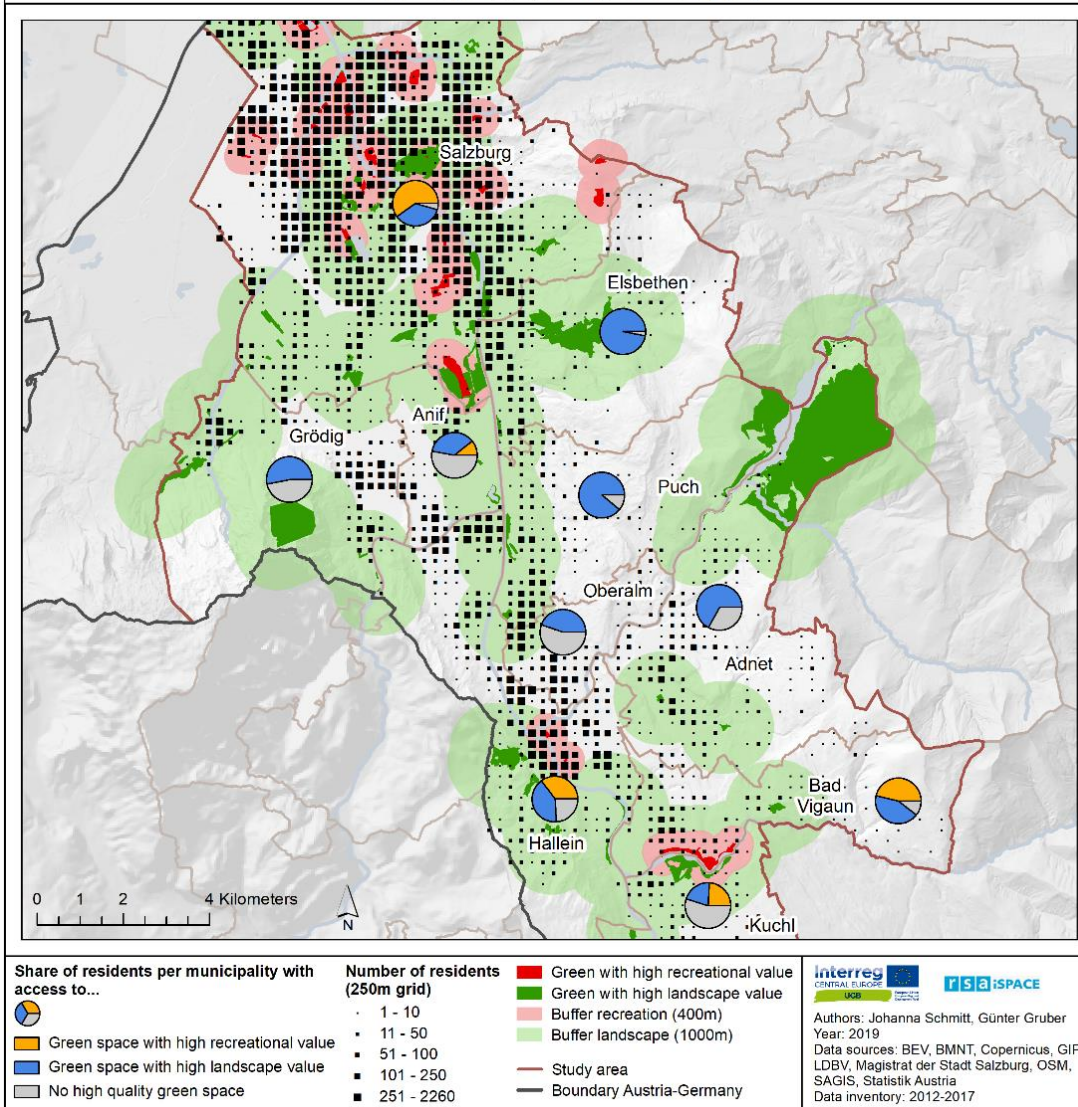
- Complementing study of recreational and landscape value to include urban, suburban, and rural green spaces
- Normalization of indicator values to assessment scales (point system) for weighted overlay
- Flexible approach:
  - Adaptation of parameters and weighting factors
  - Additional indicators





# GREEN SPACE QUALITY AND SUPPLY

Green space quality and supply



- High quality areas as a result from the index calculations
- Supply studies follow the service area concept, but
  - No network analysis at this scale
  - Recreational value dominates landscape value
- Planning and decision support basis for **upgrade demand**:
  - Good supply in the cities of Salzburg and Hallein, poor supply even in some densified regions
  - Landscape value is important for the countryside
  - Quality areas along/around water

# LANDSCAPE MATRIX

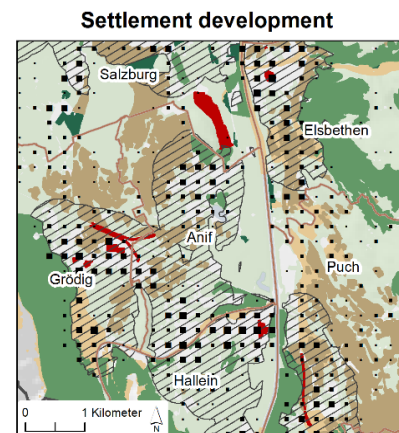
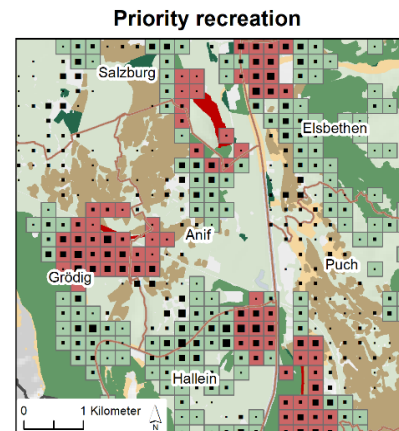
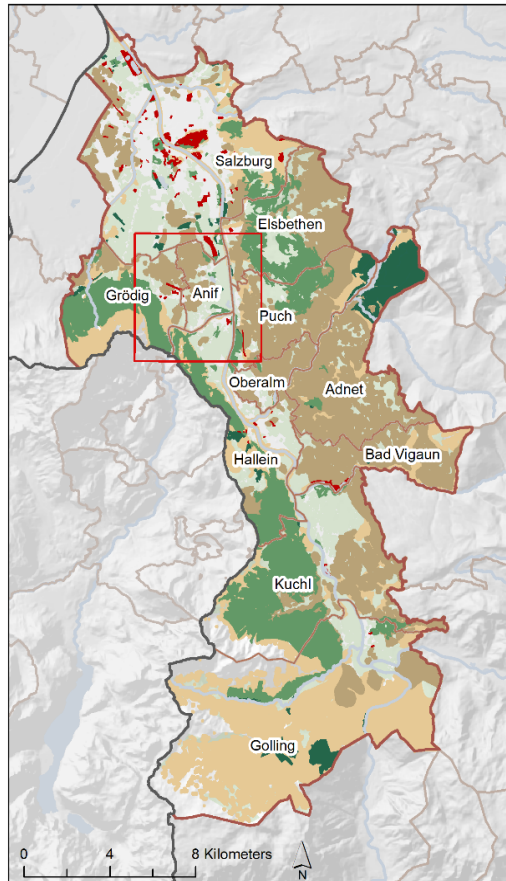
**R S A F G**

- **Priority zones** based on certain criteria for a well-balanced green space use and distribution of crucial functions
- Solutions for **overlapping functions** needed: prioritisation by predefined order of importance AND/OR local specifications

Priority zones	Criteria		Service area	Specifications
	Recreation	Landscape		
Recreation	High	Neutral	400m	None
	Medium	Neutral	400m	> 1000 residents affected
	Medium	Neutral	400m	Singularity in community
Close-to-nature recreation	Medium	High	400m	None
	Present	Medium	400m	> 500 residents affected
	Present	Medium	400m	Singularity in community
Habitat	Not present	High	1000m	None
Risk prevention	Hazard zones and forest with protective function			
Agriculture & forestry	High soil quality and forest with economic function			



## Priority zones and application scenarios



**Green space functions**

- Recreational area
- Close-to-nature recreational area
- Habitat
- Agriculture and forestry
- Risk prevention
- Boundary Austria-Germany
- Study area

Populated 250m grid cells with access to recreational areas in max. 400m walking distance

Populated 250m grid cells with access to close-to-nature recreational areas in max. 400m walking distance

Potential areas of settlement development

**Number of residents (250m grid)**

- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 2260

interreg CENTRAL EUROPE

UGB

r s a i s p a c e

Authors: Johanna Schmitt, Günter Gruber  
Year: 2019  
Data sources: BEV, BMNT, Copernicus, GIP, LDBV, Magistrat der Stadt Salzburg, OSM, SAGIS, Statistik Austria  
Data inventory: 2012-2017

- Priority zones of green space use considering functionality indices
  - Combination with supply studies
    - Populated cells are assigned with accessibility to high quality green
  - Highly flexible planning and scenario building tool in terms of:
    - Indicator choice, parameters and weighting factors for index building
    - Prioritisation criteria based on local development strategies
    - Cycle process with supply studies
- e.g. growing settlement cores for derivation of development zones

- Innovative approach to combine recreational with landscape value on FUA level
- Explore potentials of “special landscapes” with adapted indicator systems
- Assessment of existing UGS & planned UGS
- Joint investigation of settlement development (built-up areas and green supply)  
→ Lacks and needs of a well-balanced supply
- Include results in zoning and construction plans, combine with housing subsidies
- **Potentials of further development:**
  - Interactive web-map for flexible prioritisation and live simulation
  - Enlargement of the data foundations and analytic scope:
    - Qualitative data through community involvement
    - Multi-stakeholder governance for conflict handling
  - Transfer to wider area and other regions





TAKING  
**COOPERATION**  
FORWARD



DLA Conference, Dessau - 24.05.2018



**Thank you for your attention!**



Günter Gruber, Johanna Schmitt