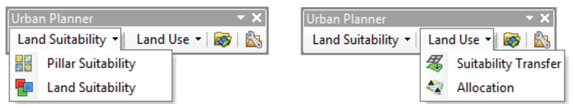
**The main aim of the poster is to introduce "Urban Planner" - ArcGIS extension for land suitability and optimal land use modelling. The model was created at the Department of Geoinformatics, Faculty of Science, Palacky University in Olomouc, Czech Republic. It allows the creation of landscape for future development, facilitates optimal functional land use and creates scenarios for future development.**

## 01: ArcGIS extension

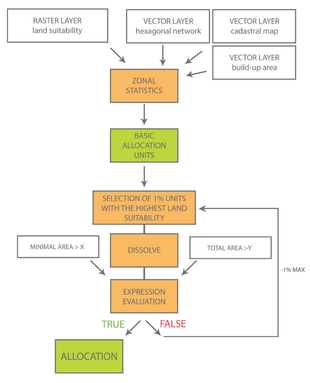
The extension is divided in two main sections (landscape potential modelling and optimal land use modelling) and uses more than 40 vector layers (Esri shapefile format/geodatabase) for analysis. The most of the layers are optional layers; it is possible to change all default values and their weights and store them in the database. For almost all calculations ArcGIS Spatial Analyst extension is needed. Default resolution of all calculations is 10 m per pixel.

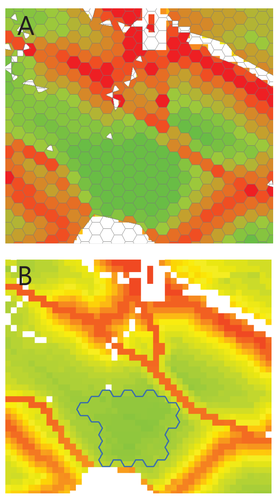



## 03: Optimal land use modelling

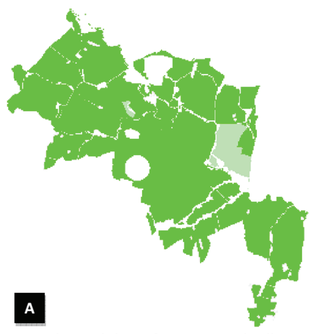
Second part of extension includes calculation of optimal land use (allocation) based on previously calculated potential, actual land use, cadastral map and hexagonal network. For each unit from hexagonal network land suitability is calculated by zonal statistics (A). Based on user inputs (minimal and total area for allocation) units with highest values of land suitability are selected and grouped into continuous area. According these steps final allocation is created (B).

### Scheme of general process of optimal land use calculation

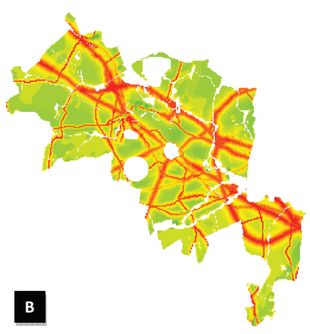



The main results of optimal land use modelling are areas suitable for allocation or land use change

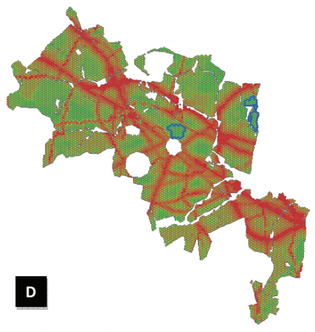


A
Land suitability of economical pillar

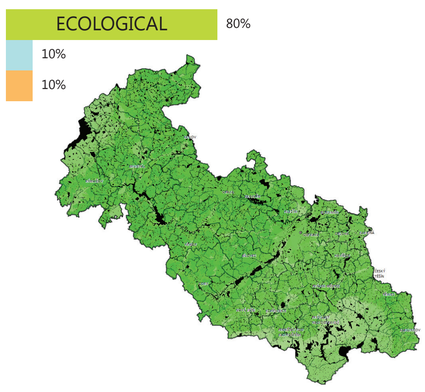


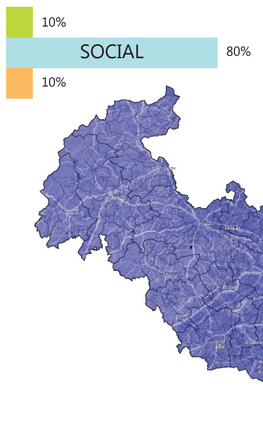
B
Total land suitability

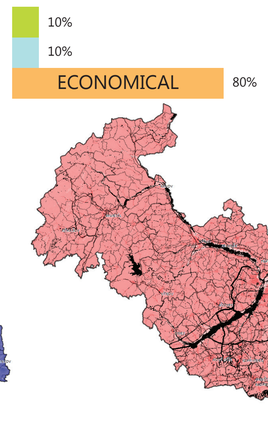
C
Basic settlement units with land suitability values



D
Basic settlement units with land suitability values with final areas suitable for allocation



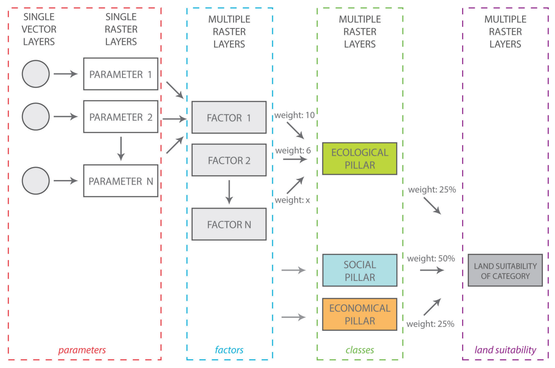




## 02: Land suitability modelling

First part of extension allows to calculate land suitability (landscape potential) for 6 selected activities (housing, light industry, heavy industry, recreation, public services & commercial infrastructure, agriculture)

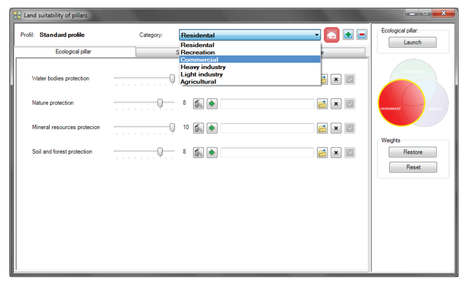
Model works with vector layers divided into 3 main categories (3 pillars – social, economic, ecologic), calculations are based on weighted overlay of input layers. Most of overlay calculations are done in raster format. Six raster layers of landscape potential are the result.

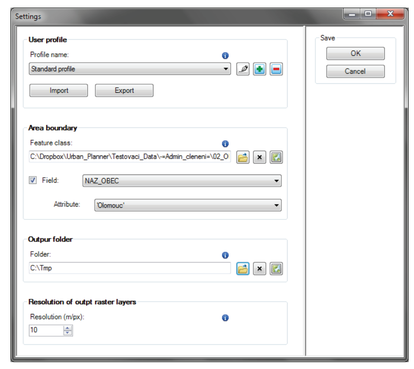
### Scheme of general process of land suitability calculation

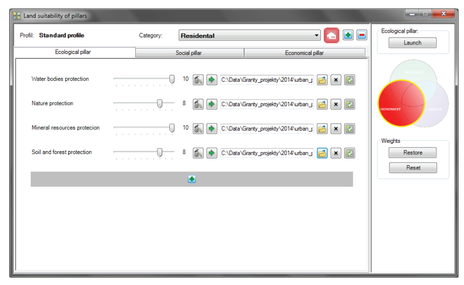


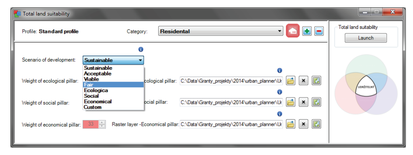

| SCENARIO | ECOLOGIC | SOCIAL | ECONOMIC | SCENARIO | ECOLOGIC | SOCIAL | ECONOMIC |
|---|---|---|---|---|---|---|---|
| SUSTAINABLE | 33% | 33% | 33% | PRIORITY OF ENVIRONMENTAL PILLAR | 60% | 20% | 20% |
| ACCEPTABLE | 40% | 40% | 20% | PRIORITY OF SOCIAL PILLAR | 20% | 60% | 20% |
| VIABLE | 40% | 20% | 40% | PRIORITY OF ECONOMIC PILLAR | 20% | 20% | 60% |
| FAIR | 20% | 40% | 40% | OWN | ?% | ?% | ?% |

### Urban Planner settings




The final results of land suitability modelling are scenarios – forecasts, which bring information about some land characteristics (optimal land use, values of a land potential for each activity). Scenarios are calculated based on weight settings between 3 pillars (ecologic, economic and social).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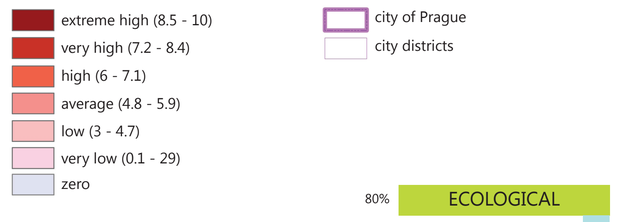
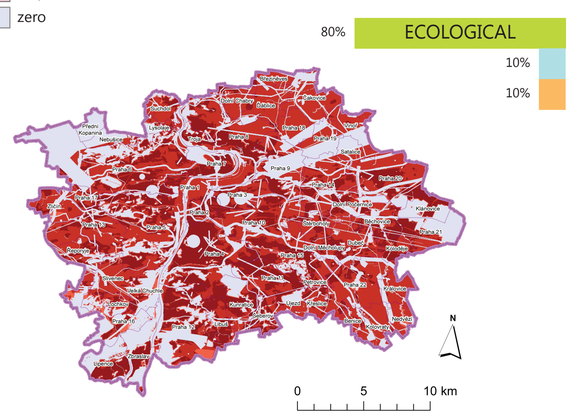
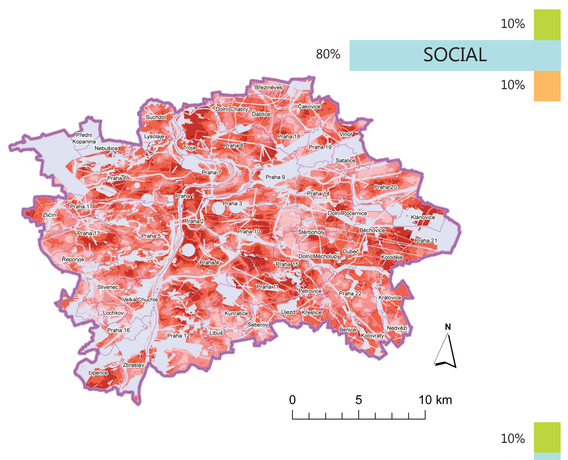
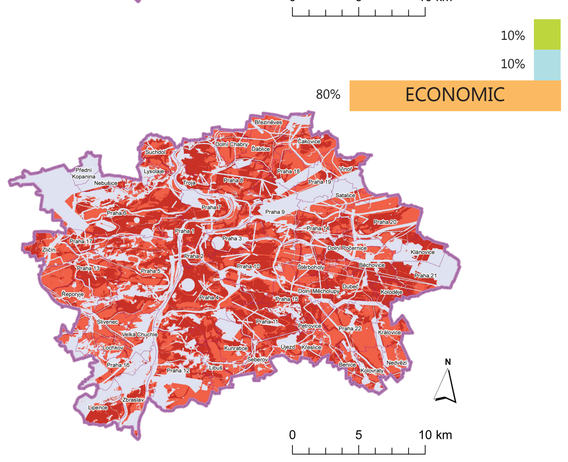
### Land suitability of - social, environmental and economic development scenarios
for the category of housing in the capital city of Prague





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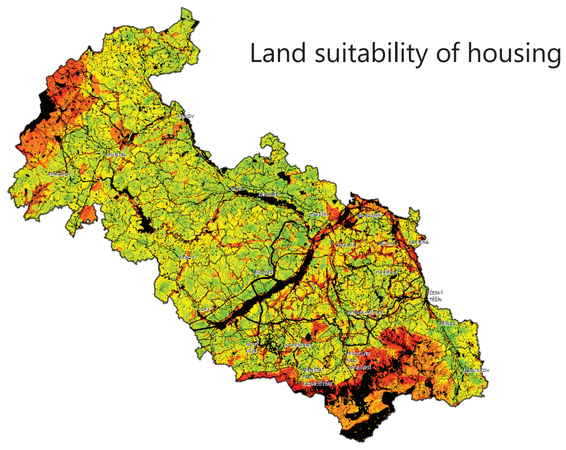
Feel free to contact me during this conference to arrange a personal meeting




## 04: Testing area

The functionality of Urban Planner was tested in two town regions - Hranicko Region and Olomouc Region, located in Moravian part of Czech Republic and in region of the capital of Czech Republic - Prague region. Practical implementaion was released in Moravskoslezsky Region. The extension was developed with strong cooperation with Olomouc local and regional government officials. The scenarios of future development and all particular results (maps, text and tables) were used in urban planning processes (local urban plan creation).