Rural-Urban Outlooks: Unlocking Synergies (ROBUST)
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## Snapshot: Expressions of Urban – Peri-Urban – Rural Relationships

# Regional Plan 4: Integrating Ecosystem Services Mapping into Regional Land Use Planning

Helsinki, Finland

## 1. Brief Description

The Helsinki-Uusimaa Region consists of 26 municipalities with a total of 1.6 million inhabitants. The 1.1 million inhabitants of the capital region alone (Helsinki, Espoo, Kauniainen and Vantaa) make up 20% of Finland's total population (Statistics Finland, 2014). In addition to this, the Helsinki-Uusimaa Region is among the fastest growing regions in Europe. Its location on the Baltic Sea, cultural climate and green landscape has made it a leading business area in Finland and a dynamic knowledge hub and innovation centre for new European business and politics. The Helsinki-Uusimaa Region consists of 26 municipalities, including the Finnish capital city Helsinki. The Helsinki-Uusimaa region's share of total labour force in Finland is about 32 % and its share of Finland's GDP is about 38 %.

The Uusimaa Regional Council is currently preparing Regional Plan 4 for the Helsinki-Uusimaa Region, which complements the previous regional land use plans. Helsinki-Uusimaa Regional Council is a joint regional authority for the Helsinki-Uusimaa Region and it operates according to the principles of local self-government. Therefore, its members are the municipalities in the region, from which it receives its funding. Like all 18 regional councils in Finland, it is mandated by law. The tasks of the Helsinki-Uusimaa Regional Council include regional and land use planning and promoting local and regional interests in general. The Council articulates common regional needs, long term development goals and conditions for sustainable development.

In the Helsinki-Uusimaa region, the regional planning aims at 1) a well-functioning and coherent urban structure, 2) seamless traffic arrangements for decreasing emissions, 3) good terms and conditions for trade and business, 4) sufficient recreational areas, and 5) ecological sustainability. The regional plan shows the land uses that are important on a national and regional level. Careful land use planning and the geographical location of communities and activities is an essential element for providing high standards of living, the functionality of the physical environment and sustainable development.

The goal of the Regional Plan 4 is to ensure the competitiveness of the region while not exceeding the limits of sustainable development. The Regional Plan 4 concentrates on five themes, namely green infrastructure, business and innovation, logistics, wind energy and cultural heritage. This regional case study on green infrastructure and ecosystem services in the Helsinki-Uusimaa Region was implemented in 2016-2017 in cooperation with the Uusimaa Regional Council, and the results are utilized in the planning of the green infrastructure theme of Regional Plan 4. The goal of the study was to map green infrastructure and ecosystem services in order to include these as a part of the planning process and sustainable land use. The strong growth of the region has generated a constant pressure to densify the urban structure and convert new areas for residential purposes. In order to ensure the goals of sustainable development, safeguarding biodiversity and sustaining vital ecosystem services, green infrastructure must be integrated into land use planning and decision-making at all levels. In this task, the Regional Plan 4 has a special role.

## 2. Questions and/or Challenges

Helsinki-Uusimaa Regional Council aims to provide useful information to political decision makers, the preparers and the public about ecosystems services. The Regional Council has analysed the possibilities to include ecosystem services to regional programme which define the regional land use and planning in the region. The main aim is to avoid potential future land use conflicts of sustainable development and strong urbanization by mapping the supply of ecosystem services in the study region**.** Therefore, the study asks: where are the important green areas and where can less harmful new building sites be located? These questions are answered by mapping ecosystem services and green infrastructure in the region and finally by integrating ecosystem services into the regional land use plan.

In order to assess the regional Green Infrastructure (GI), the potential supply of Ecosystem Services (ES) was analysed using the GreenFrame methodology developed by SYKE (see the details Itkonen et al. 2014). GreenFrame is an integrated approach to study the variation in the ES supply within a study region, making use of a wide variety of spatial data and expert knowledge. Instead of quantifying the actual stocks and flows of ecosystem services, the aim is to valuate areas based on their potential to support the supply of various ES. Spatial data is usually scarce on regulating and maintenance services and intangible services, such as cultural ecosystem services, and therefore, previous studies and stages of the regional plans have not considered ES in land use planning. GreenFrame provides an approach to infer this information from related thematic data based on assessments from experts and local and regional actors. Qualitative assessments can be complemented with existing quantitative spatial data from the study area. Quantitative data is more often available for tangible provisioning services, such as timber volume.

# 3. Main Insights

## 3.1. Indications of the application of the new concept of 'New Localities'

The GreenFrame analyses of ES supply potential were used to identify the areas with highest ES supply potential outside the network of protected areas and other valuable areas of nature. Instead of examining the supply potential of all ES, these analyses concentrated on the most relevant and important ES from the perspective of regional land use planning in the Helsinki-Uusimaa region. Having discussed their information needs, the regional planners selected the following 10 ES:

- Agricultural and aquaculture products (P1)
- Surface and ground water for drinking (P3)
- Materials from plants, algae and animals and genetic materials from all biota (P5)
- Biomass-based energy sources (P6)
- Hydrological cycle and flood protection (R4)
- Maintenance of nursery populations and habitats, gene pool protection (R7)
- Global climate regulation (R11)
- Recreational use of nature (C1)
- Aesthetics and cultural heritage (C3)
- Existence and bequest values of nature (C5)

The best 20% of the landscape, having the highest supply potential for the selected ES, was included.

## 3.2. Insights related to the broad area of 'Smart Development'

Constantly increasing population and land use change could be named as the top drivers of change in the Helsinki-Uusimaa Region. The Helsinki-Uusimaa region is one of the fastest growing urban regions in Europe, which causes many indirect impacts on the ecosystems through urban sprawl and natural resource consumption for new construction, livelihoods, energy consumption, and recreation. To prevent further urban sprawl and to mitigate climate change by increasing the eco-efficiency of cities, densification of urban structure is encouraged. This has a twofold impact on the green infrastructure: areas providing ecosystem services diminish and the number of potential users grows.

## 3.3. Other insights that could be relevant for further work

Based on the study, in order to ensure the goals of sustainable development, safeguarding biodiversity and sustaining vital ecosystem services, ecosystem services maps are valuable for spatial planning and decision making at all levels:

1. Advance our understanding about the consequences of urban growth for ecosystem services,
2. Give more opportunities for coordination,
3. Offer possibilities for more efficient decision making because of increasing knowledge.

## 4. Data Sources and Indicators

In the first phase, the potential supply of 23 ecosystem services was analysed (Table 1). Each ES was first assessed individually using the data themes. The data themes were pre-processed into a compatible format and overlaid in GIS. The weighting of each theme in the assessment of each ES was determined by expert evaluation (for the method, see Kopperoinen et al. 2014).

Table 1. The potential supply of 23 ecosystem service groups in total was analysed. (Source Itkonen et al. 2015)

| ES section | ES group | |
|---|---|---|
| P: Provisioning | P1 | Agricultural and aquaculture products |
| | P2 | Wild plants, animals and their outputs |
| | P3 | surface and ground water for drinking |
| | P4 | surface and ground water for non-drinking purposes |
| | P5 | materials from plants, algae and animals and genetic materials from all biota |
| | P6 | Biomass-based energy sources |
| R: Regulating and Maintenance | r1 | mediation of waste and toxics |
| | r2 | mediation of smell/noise/visual impacts |
| | r3 | mass stabilization and control of erosion rates, buffering and attenuation of mass flows |
| | r4 | hydrological cycle and flood protection |
| | r5 | mediation of air flows |
| | r6 | Pollination and seed dispersal |
| | r7 | maintenance of nursery populations and habitats, gene pool protection |
| | r8 | Pest and disease control |
| | r9 | soil formation and composition |
| | r10 | maintenance of chemical condition of waters |
| | r11 | Global climate regulation |
| | r12 | micro and regional climate regulation |
| C: Cultural | C1 | recreational use of nature |

| | | |
|---|---|---|
| | C2 | nature as a site and subject matter for research and of education |
| | C3 | Aesthetics and cultural heritage |
| | C4 | spiritual, sacred, symbolic or emblematic meanings of nature |
| | C5 | existence and bequest values of nature |

As outputs of these analyses, 23 raster layers of the supply potential of different ES groups were created. These 23 layers were normalized to a common scale and combined to form composite layers of each of the three ES sections (provisioning services, regulating and maintenance services, cultural ecosystem services). Finally, these composite layers were normalized again and combined into a final synthesis layer, where all three ES sections were included and ranked as equally important. Moreover, each individual ES group within an ES section composite was included and ranked as equally important (Figure 1).

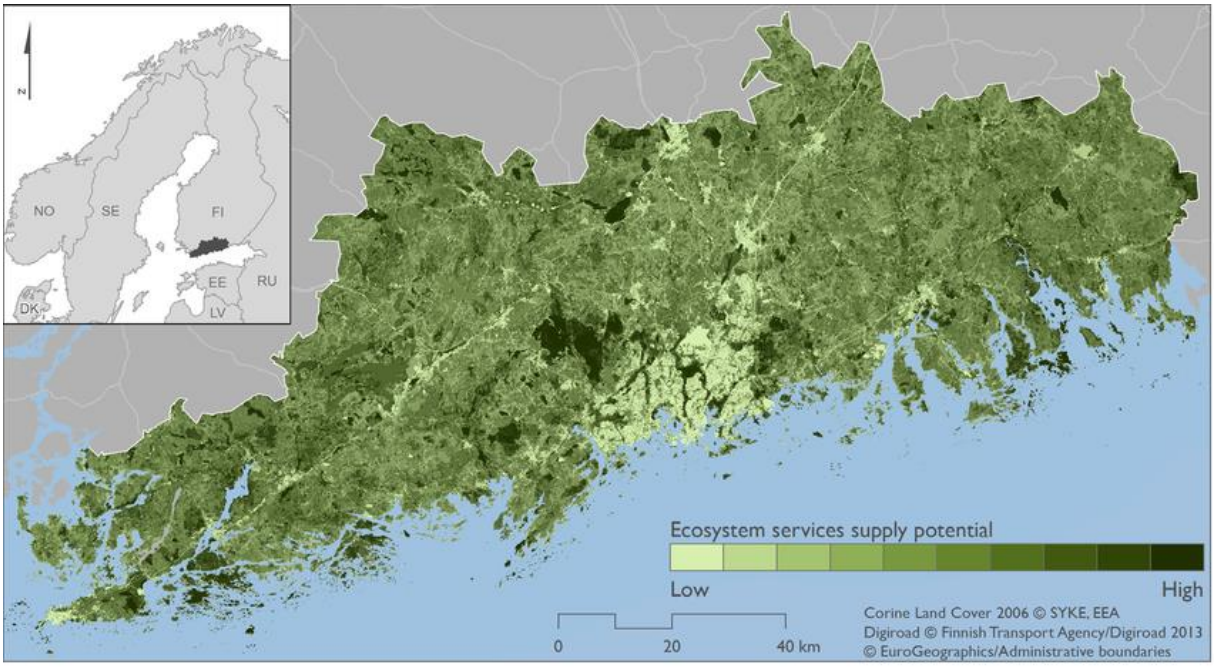


Figure 1. The regional variation in the overall ecosystem services supply potential in the Helsinki-Uusimaa region. Source: Itkonen et al. 2015

## 5. Critical Appraisal of Data Use

The major obstacle to integrate ecosystem services into the regional land use plan was related to the legal effects because it would have limited the land use of private landowners. Therefore, there is a high demand to identify and promote policies and governance models that could solve this kind of governance conflict. However, the case study has been valuable because the ecosystem services have now been discussed among land use planning

professionals and there is a clear common understanding about including ES in regional planning.

Data has been useful and could be utilized in WP3 and other regions as well.

## 6. References

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