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Faculty of Human Geography and Planning

Ecosystem Services Approach on the Way to Implementation – Inside View from Poland

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ES concept

The definition after Potschin-Young M. et al., 2018. Glossary for Ecosystem Service mapping and assessment terminology. Deliverable D1.4 EU Horizon 2020 ESMERALDA Project, Grant agreement No. 642007):

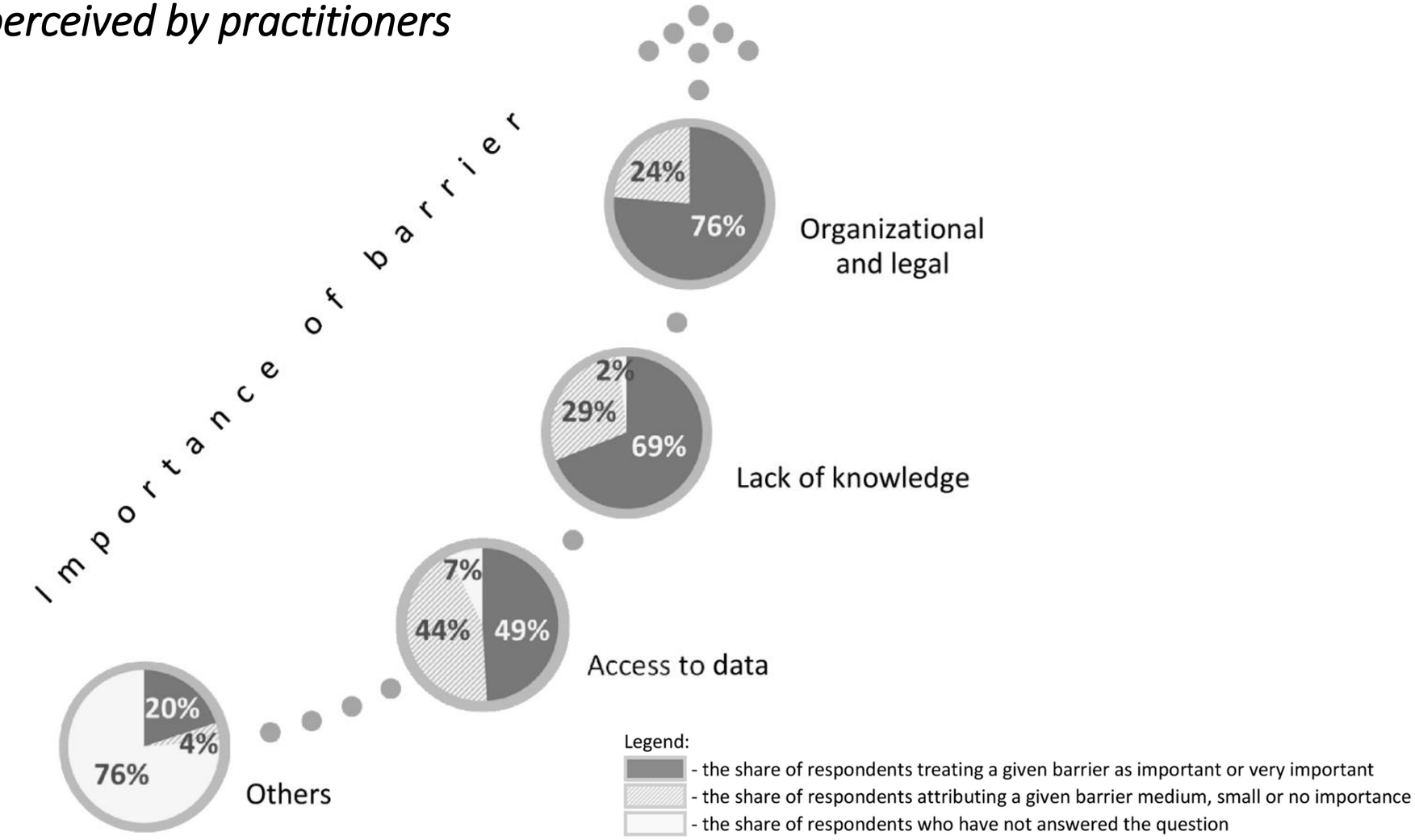
The contributions of ecosystems to benefits obtained in economic, social, cultural and other human activity

Three types of ecosystem services:

- Provisioning
- Regulating
- Cultural

Challenges for ES implementation

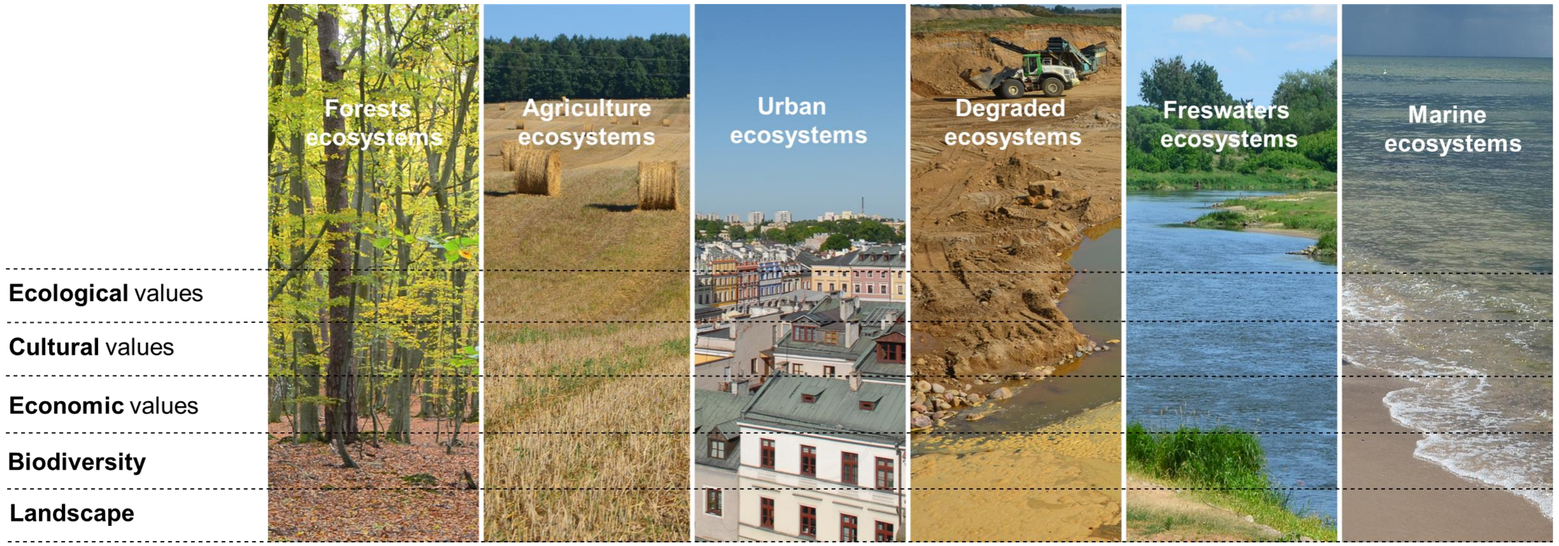
The main barriers perceived by practitioners



Source: Stępniewska et al., Ecosystem Services 33 (2018), pp. 59–67

ECOSERV-POL project for burst the ES operationalisation

„Services provided by main types of ecosystems in Poland –an applied approach”



Project Leader&Promoter	Adam Mickiewicz University in Poznań
Project Partners	Forest Research Institute and Bureau for Forest Management and Geodesy Institute of Soil Science and Plant Cultivation Institute of Geography and Spatial Organisation European Regional Centre on Ecohydrology Institute of Oceanology Poznań University of Life Sciences Faculty of Geography and Regional Studies of the University of Warsaw Warsaw Ecological Economics Center of the University of Warsaw Norwegian Institute for Nature Research

ECOSERV-POL project for burst the ES operationalisation

„Services provided by main types of ecosystems in Poland –an applied approach”

Challenges:

1. Recognizing the opportunities of various scientific organizations in Poland for networking
2. Focusing on the use of developed methods by different groups of stakeholders:
   - Selection of data sources at various spatial scales
   - Shifting from recognizing individual ES to their bundles
   - Distinction between potential, actual flow and demand for ES
   - Combining social, economic and ecological values

ECOSERV-POL project for burst the ES operationalisation

„Services provided by main types of ecosystems in Poland –an applied approach”

Deliverables

Lists of relevant ecosystem services (ES) and their indicators for main ecosystem types

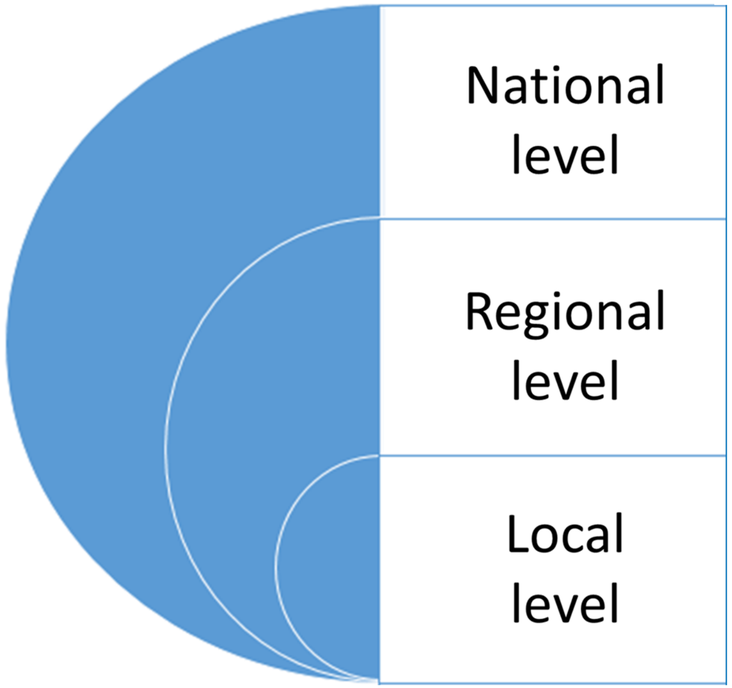
Maps and assessments of ES in national, regional and local scales based on selected indicators

Significant ES synergies, trade-offs and bundles for individual ecosystem types

Cross-cutting analysis of ecological, cultural and economic values of ES

Handbook on ES approach for environmental management

Scales covered

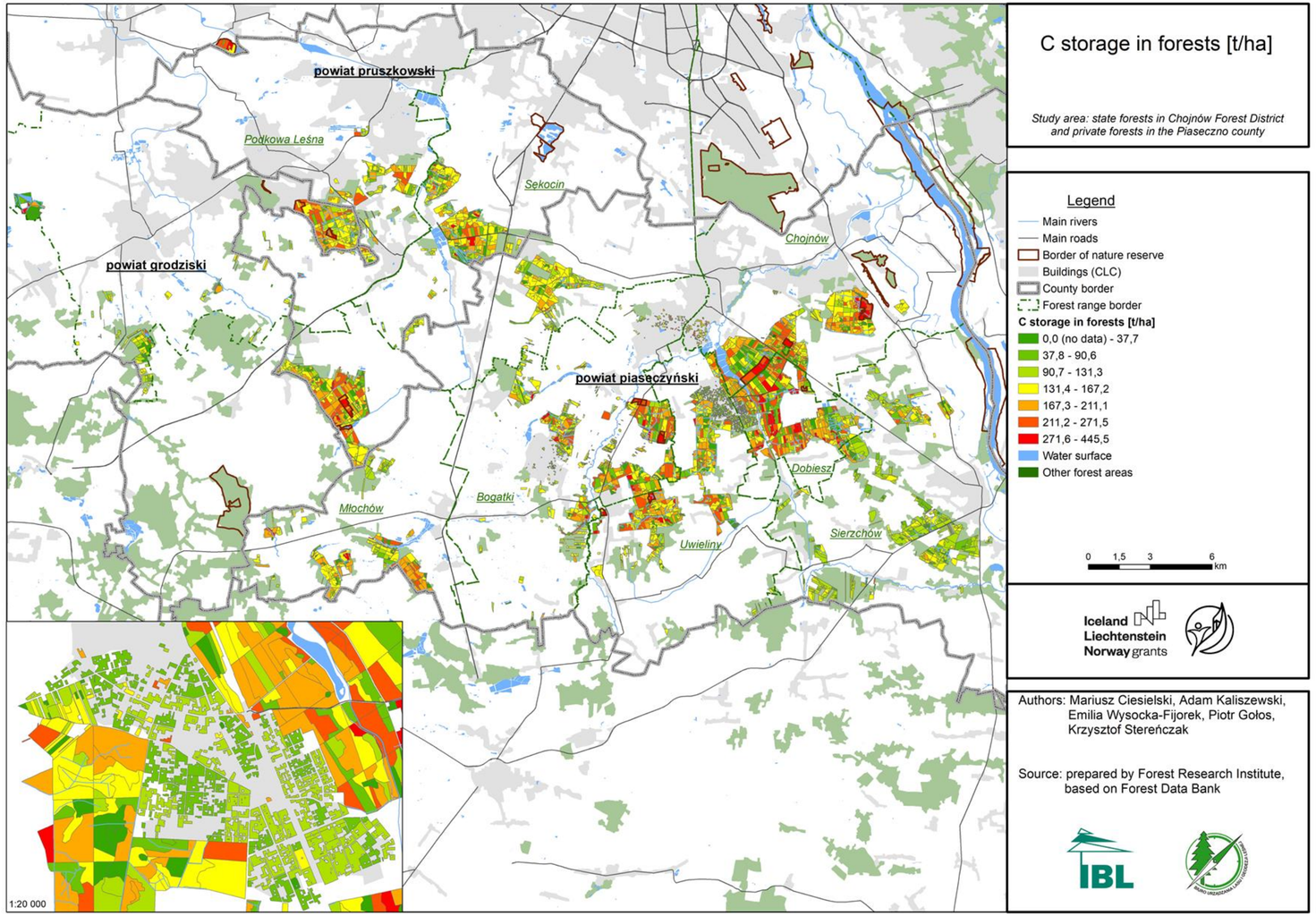


Forest ecosystems – tackled issues

Forest Research Institute & Bureau for Forest Management and Geodesy

- **Suggested indicators** (45) and data sources for 5 provisioning ES, 9 regulating and maintenance ES, and 3 cultural ES.
- Consideration of ES level depending on **forest characteristics**: stand age, management intensity, habitat humidity.
- ES mapping on a national scale – basic spatial units: **forests sub-districts** (856 for the entire Poland).

Case studies – forests of Chojnów Forest District and Western Sudetes Promotional Forest Complex



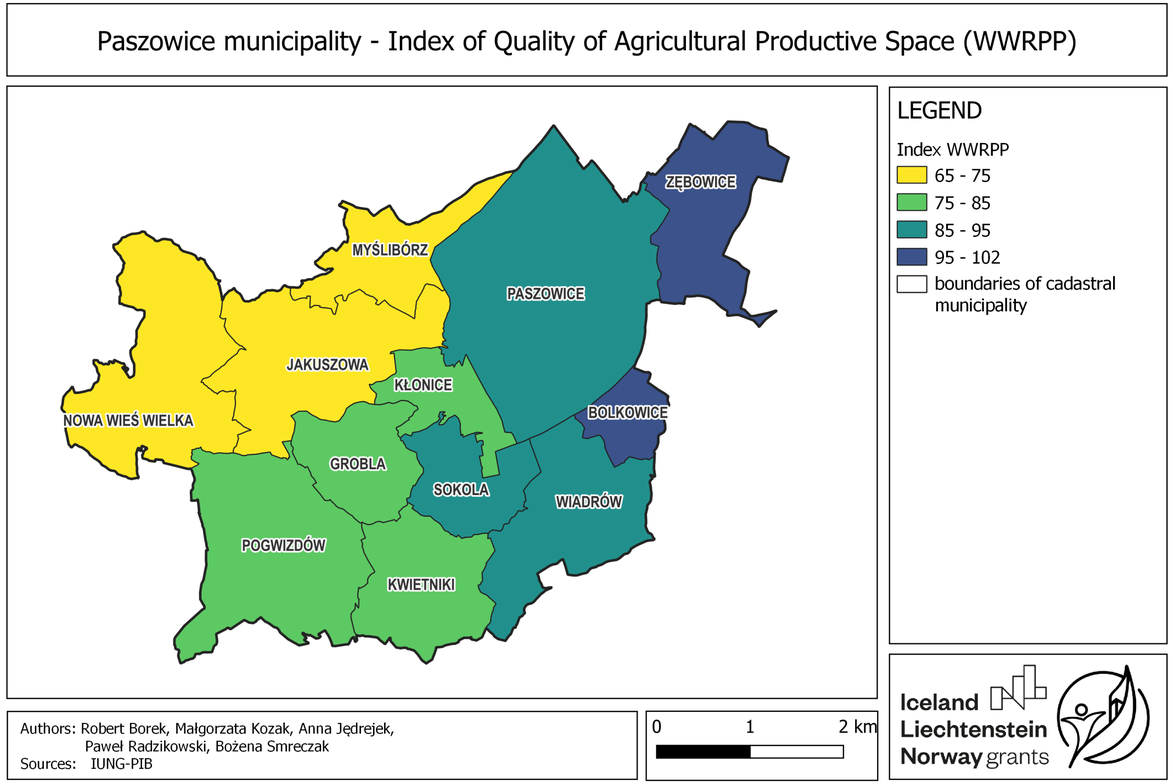
Source: Kaliszewski et al., 2022, www.ecoservpol.amu.edu.pl/rezultaty-projektu

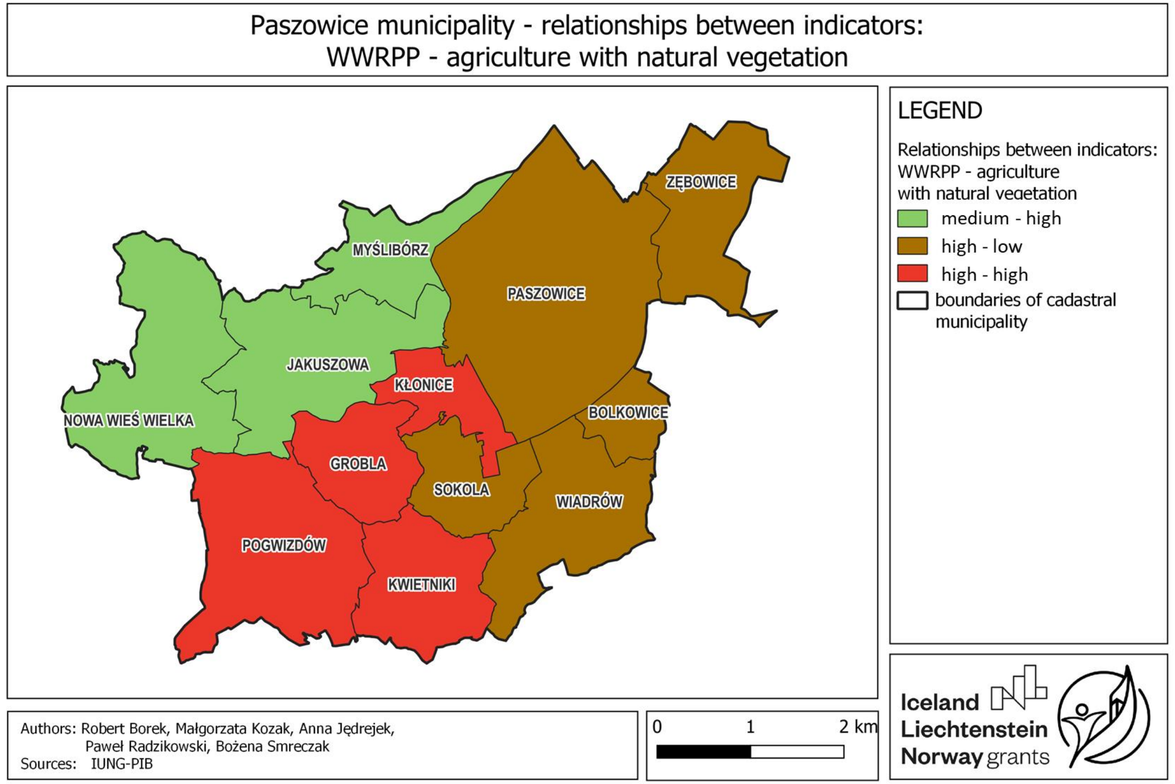
Agroecosystems – tackled issues

Institute of Soil Science and Plant Cultivation

- **Suggested indicators** (126) and data sources for 7 provisioning ES, 13 regulating ES, and 8 cultural ES.
- Specifity of ES provision in agroecosystems subtypes that differ in the **intensity of agricultural production** (conventional, agroecological) and **production direction** (plant, livestock, mixed production).
- ES mapping on a national scale – basic spatial units: **communes** (2477 for the entire Poland).

Case studies – dolnośląskie, lubelskie and łódzkie voivodeships; Paszowice, Miączyn and Kiełczygłów municipalities; conventional farm with cereal crops and organic farm with an agroforestry model of horticultural production





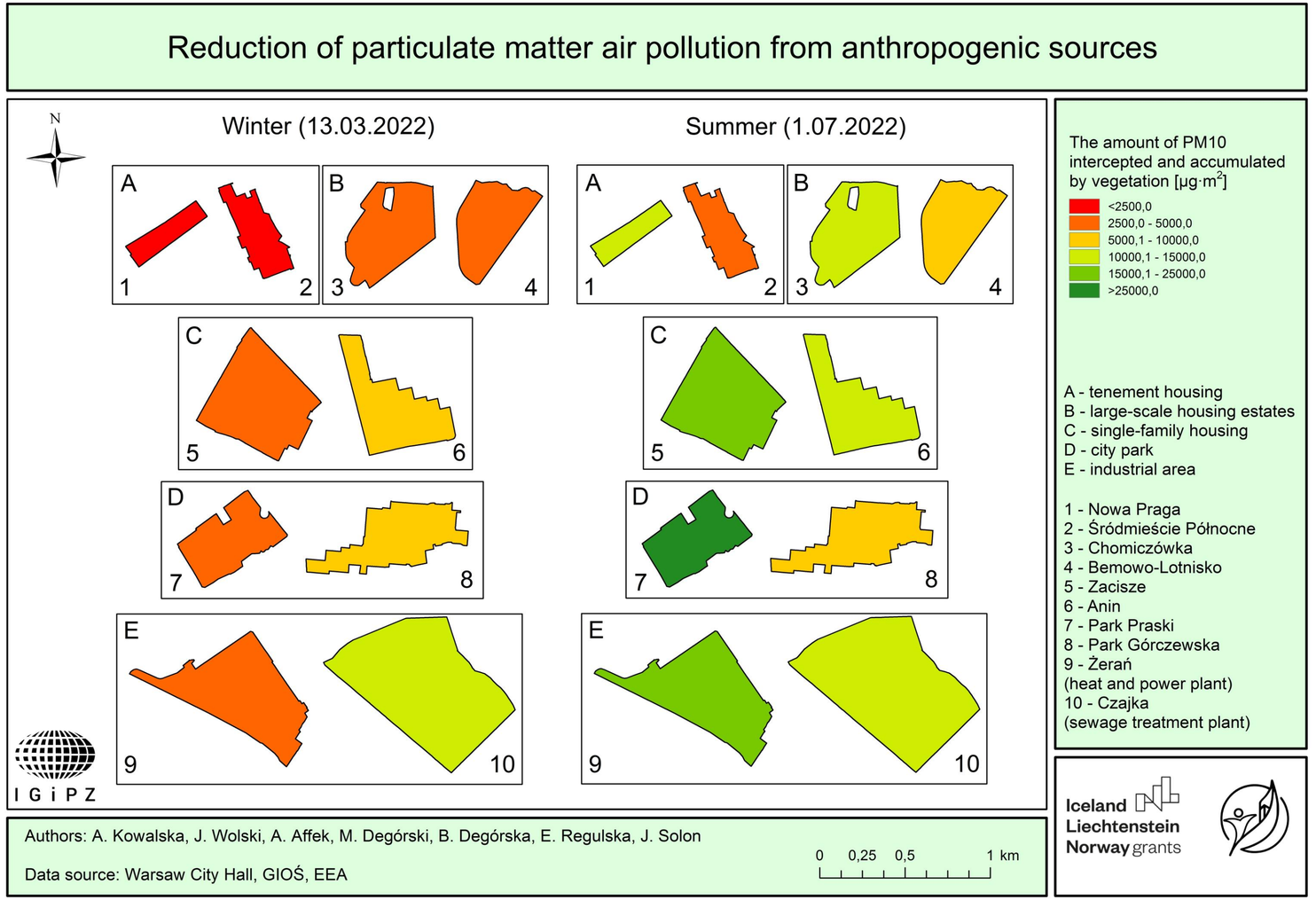
Source: Borek et al., 2022, www.ecoservpol.amu.edu.pl/rezultaty-projektu

Urban ecosystems – tackled issues

Institute of Geography and Spatial Organization

- **Suggested indicators** (79) and data sources for 4 provisioning ES, 14 regulating and maintenance ES, and 7 cultural ES.
- Bundles of key ES for ecosystem subtypes: **high-density** residential, commercial and industrial areas; **medium-density** residential areas and communication infrastructure; **low-density** residential areas, sport and recreation areas, and agriculture areas; **forests and urban greenery**.
- ES mapping on a national scale – basic spatial units: functional urban areas with the status of a **metropolitan area** (20 for the entire Poland).

Case studies – Warsaw (18 districts, 143 areas of the Municipal Information System, 10 test sites).



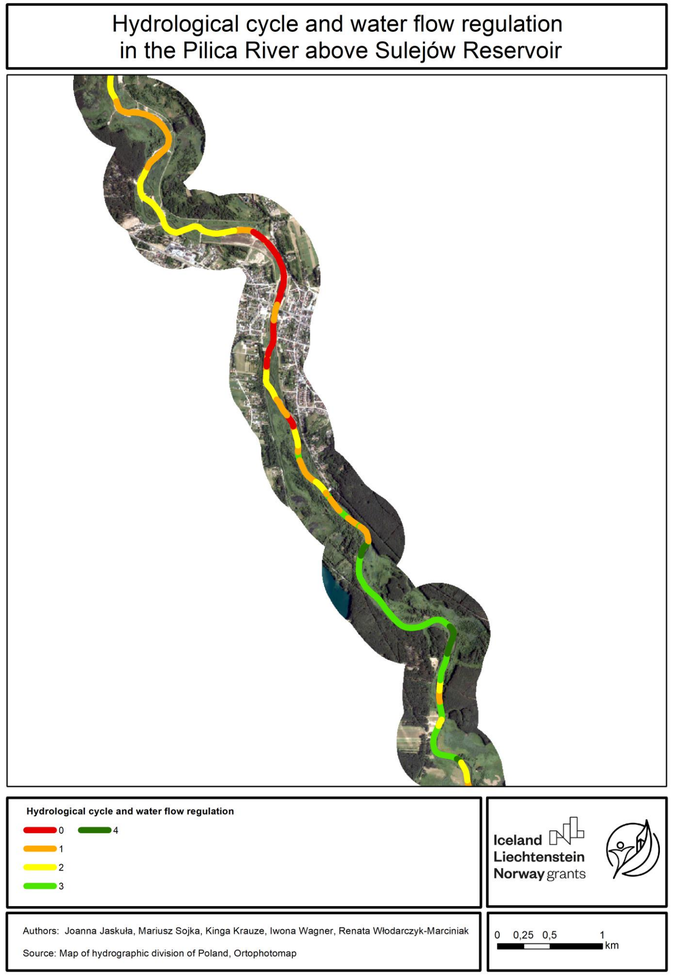
Source: Degórski et al., 2022, www.ecoservpol.amu.edu.pl/rezultaty-projektu

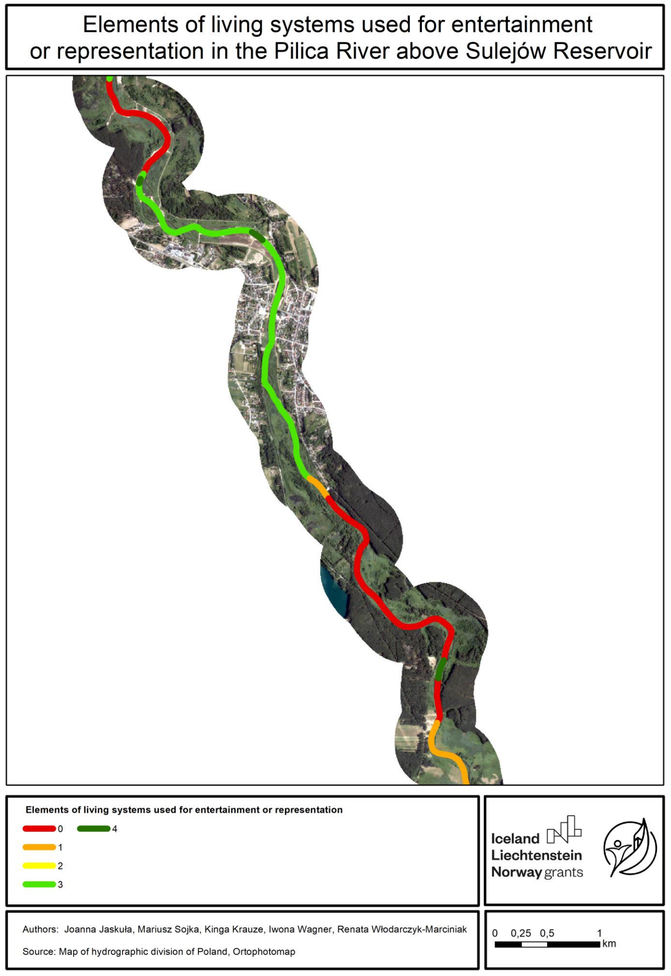
Freshwater & wetland ecosystems – tackled issues

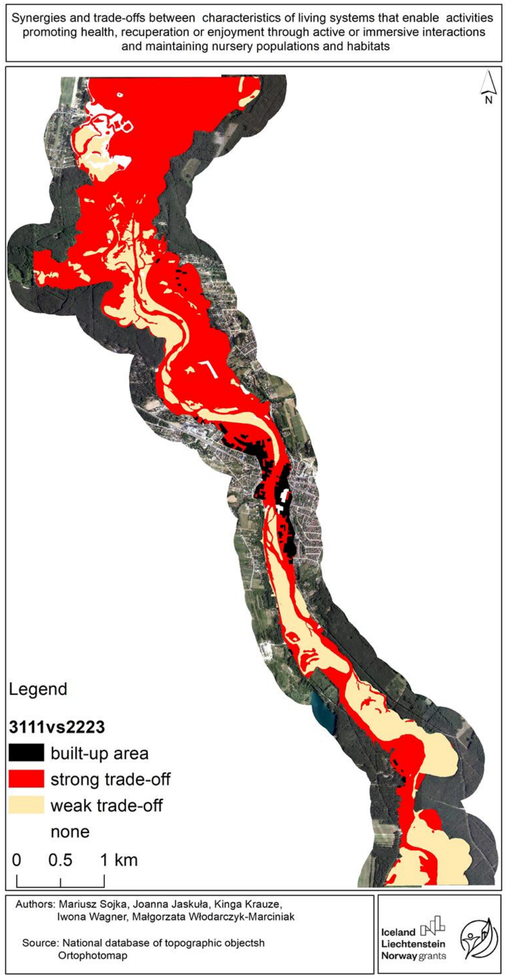
European Regional Centre on Ecohydrology

- **Suggested indicators** (163) and data sources for 7 provisioning ES, 11 regulation and maintenance ES, and 9 cultural ES.
- Consideration of ES in ecosystem subtypes: **rivers** with the valley and the hyporheic zone; **lakes** with the coastal zone and interstitial waters**; wetlands**.
- ES mapping on a national scale – **different** basic spatial units: groundwater balance units (109 for the entire Poland), surface water bodies (5627), and communes (2477).

Case studies – Pilica River and Drzewiczka River catchments







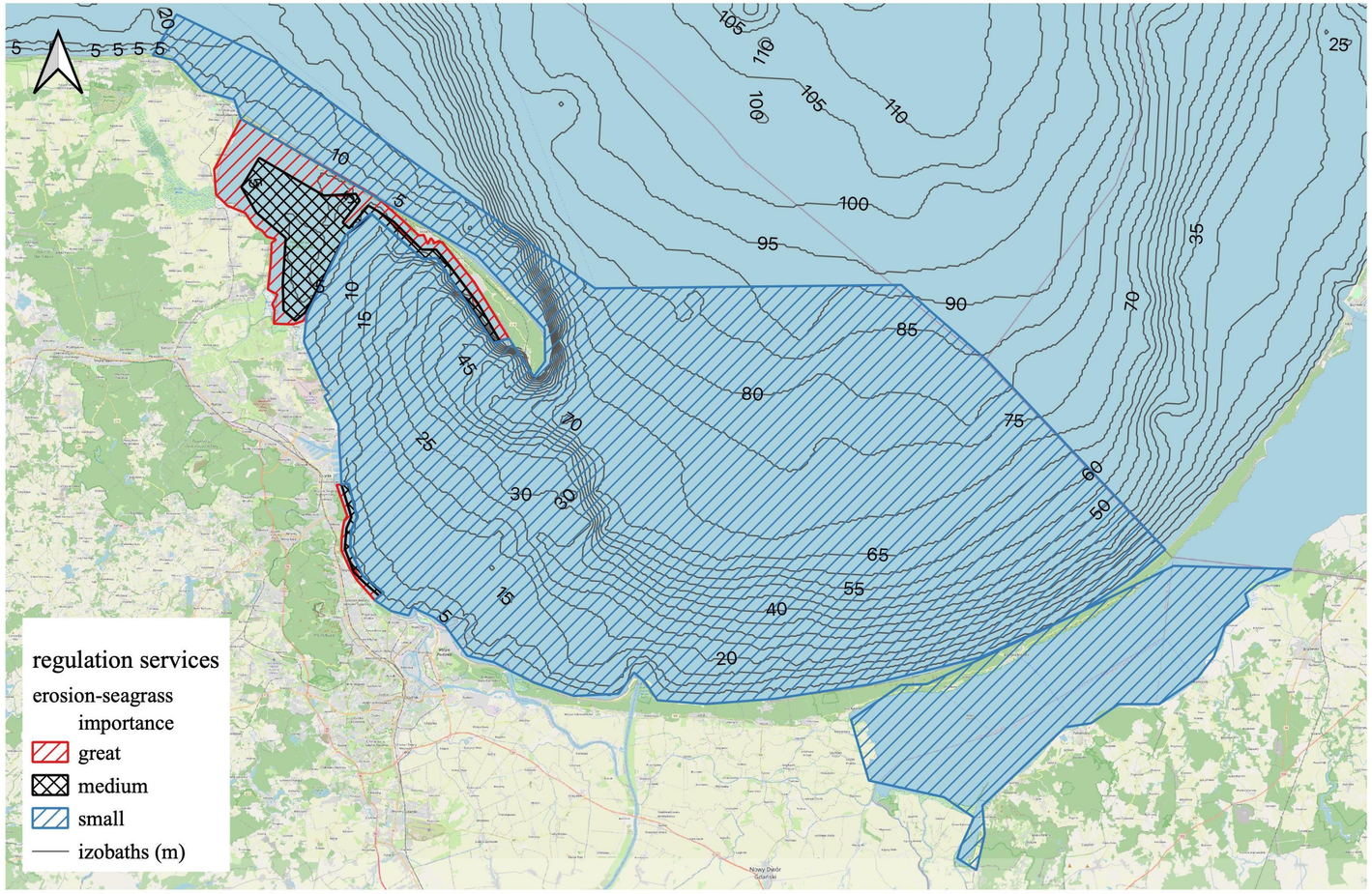
Source: Krauze et al., 2022, www.ecoservpol.amu.edu.pl/rezultaty-projektu

Marine ecosystems – tackled issues

Institute of Oceanology

- **Suggested indicators** (10) and data sources for 1 provisioning ES, 4 regulation and maintenance ES, and 5 cultural ES.
- Bundles of key ES for **benthic habitat types**: seagrass meadows, stone reefs, sandy shallows and beaches, reeds in shallow bays, and mussel beds outside the euphotic zone.
- ES mapping on a national scale – **Polish Marine Areas**.

Case studies – Gulf of Gdańsk, Vistula Lagoon



Areas important for seagrass growth (across the Gulf of Gdańsk) as an indicator of protection against coast erosion ES

Source: Koroza et al., 2021, www.ecoservpol.amu.edu.pl/rezultaty-projektu

Valuation of different benefits – tackled issues

- Ecological values *[Poznań University of Life Sciences]* – **selection of indicator species** from a huge number of taxa to assess the ecological values of ES.

  Case studies – city of Poznań, Wielkopolski National Park, Mosina commune.

- Cultural values *[Faculty of Geography and Regional Studies of the University of Warsaw]* – **selection of methods** considering the specificity of values.

  Case studies – Węgorzewo and Miłakowo communes, city of Poznań.

- Economic values *[Warsaw Ecological Economics Center of the University of Warsaw]* – **capturing the variety of components** of total economic value (use value, non-use value).

  Case studies – city of Warsaw, forests of Warsaw Agglomeration, Białowieża Forest.

Fig. 1

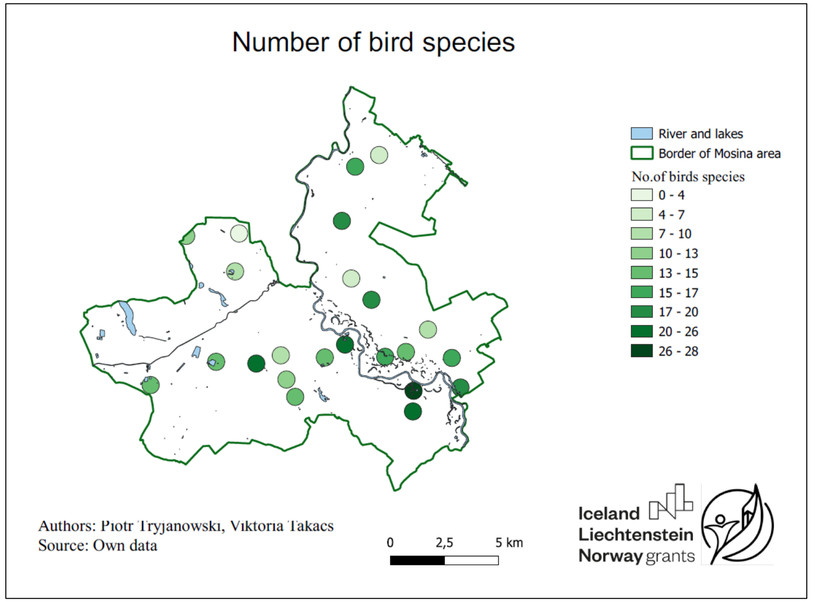


Fig. 2

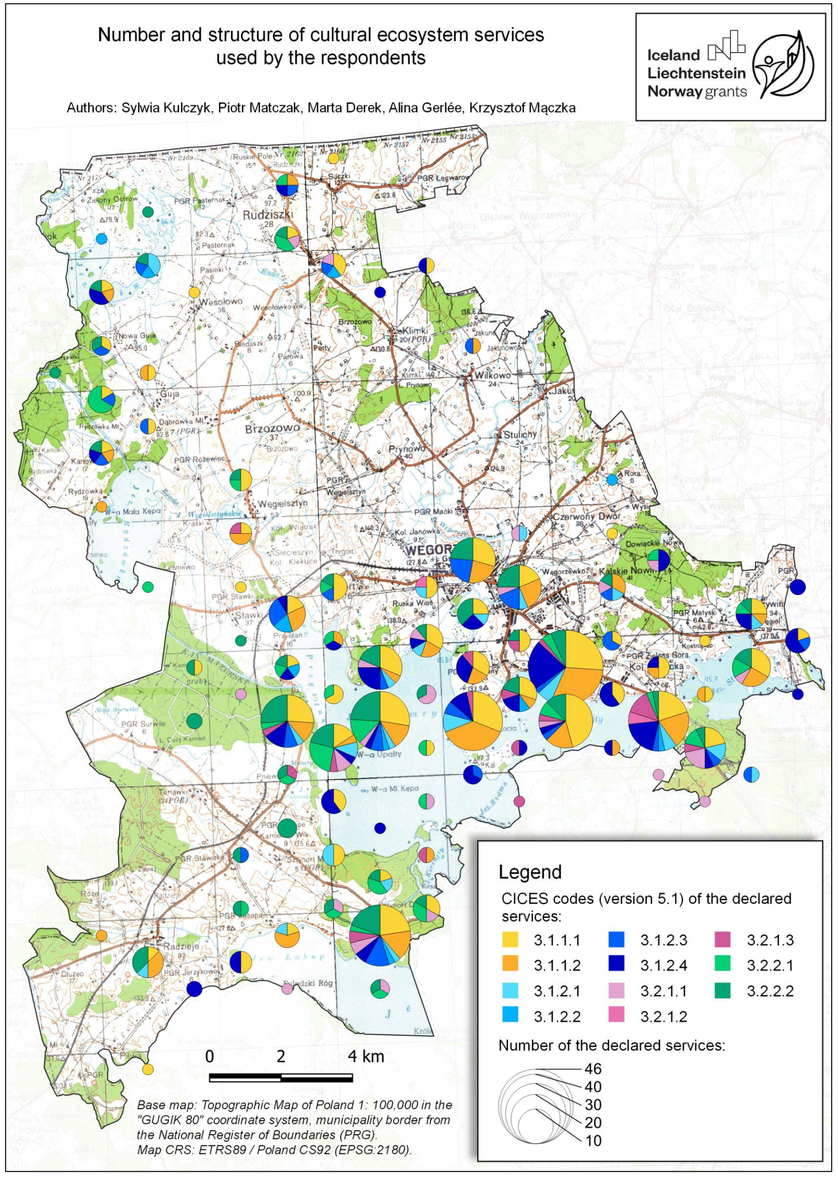
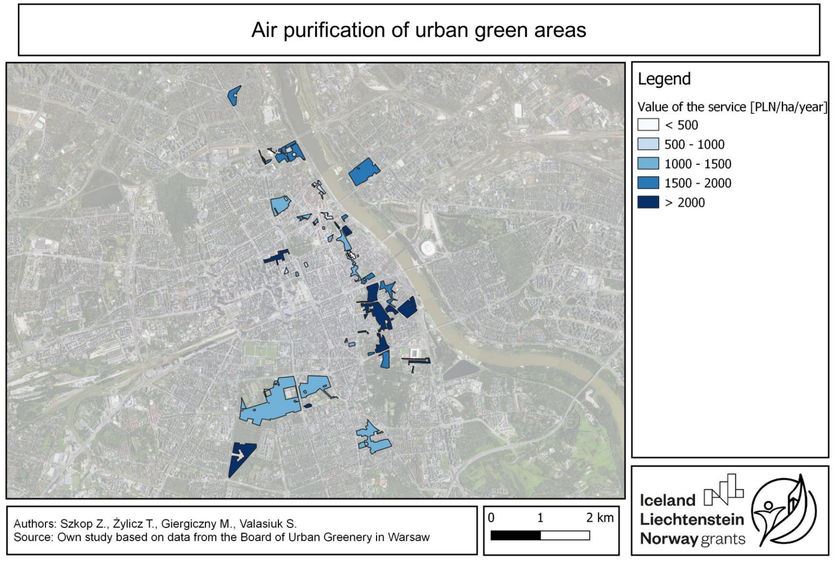


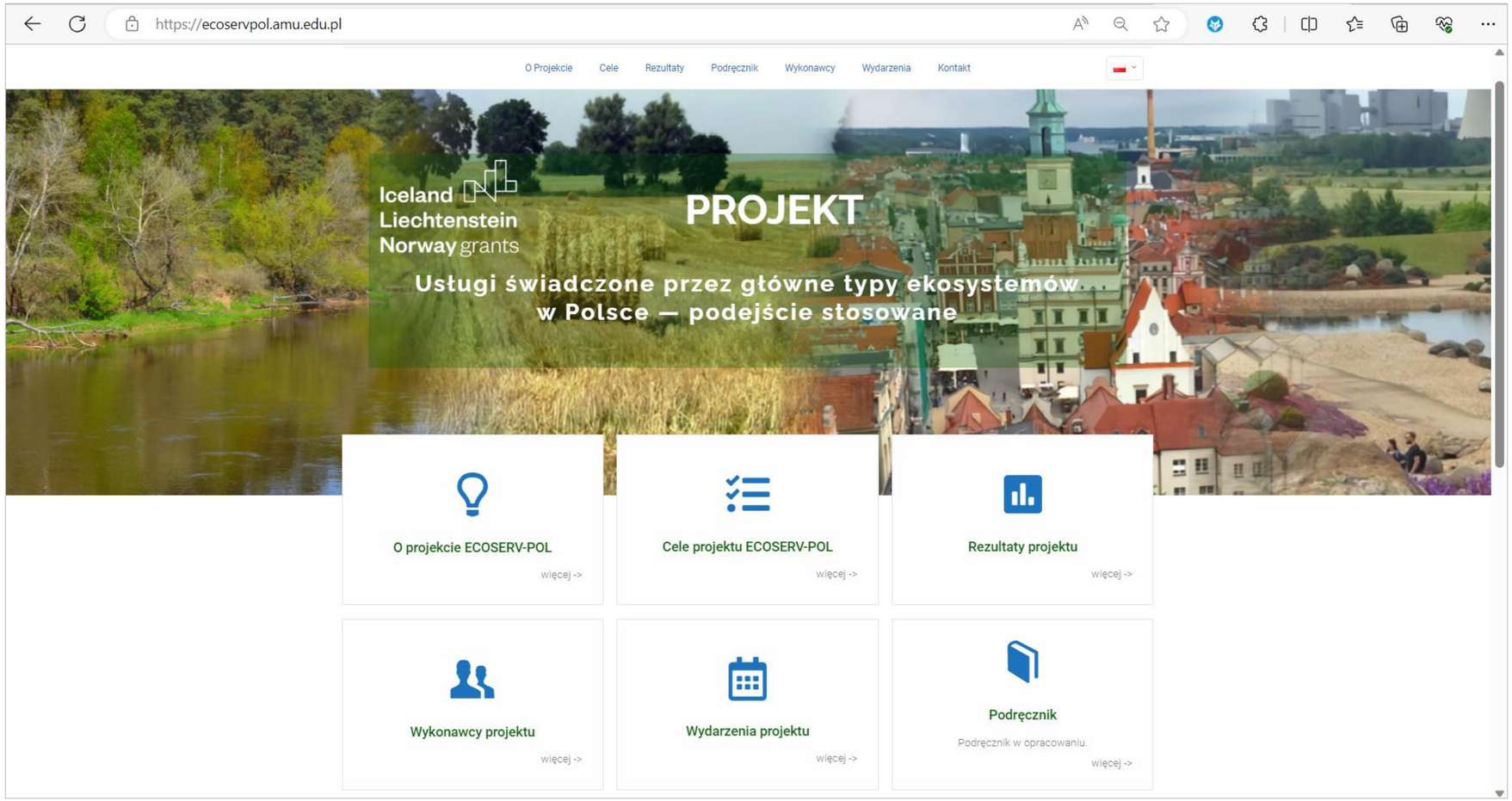
Fig. 3



Source: Takacs et al., 2022 (Fig. 1); Kulczyk et al., 2021 (Fig. 2), Szkop et al., 2021 (Fig. 3)

www.ecoservpol.amu.edu.pl/rezultaty-projektu

Project websites



www. ecoservpol.amu.edu.pl

www. ecoservpol.amu.edu.pl/en

Handbook on ES approach for environmental management

Ebook available online www.ecoservpol.amu.edu.pl/podrecznik

Conclusions

- ES are an **attractive framework** linking the natural and social sciences, intending to develop an awareness of the benefits to humans resulting from the sustainable use of ecological systems.
- Regardless of the undoubted progress, there are **several challenges, the solution of which determines the implementation of the ES concept** into practice at a satisfying level.
- ECOSERV-POL project has **increased scientific potential** to map and assess ES; **provided sets of ES and their indicators** on national, regional and local scales; **raised awareness** of representatives of various levels of administration about the ES approach.


Thank you for attention