Norway grants

The National Centre for Research and Development

Enhancing the user uptake of Land Cover / Land Use information derived from the integration of Copernicus services and national databases „InCoNaDa”

Introduction to the InCoNaDa project

Agata Hościło & Geir-Harald Strand

IGiK

NIBIO NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

IOŚ-PIB

Lodz University of Technology

EVERSIS

Why land cover and land use?

- Land cover (LC), land use (LU) information is essential for a broad range of users and applications.
- It is crucial for land management, monitoring of sustainable development of agriculture, forestry, rural areas, assessment of biodiversity status and losses, urban planning and land uptake.
- LCLU is essential for various reporting obligations, e.g. for counting greenhouse gas (GHG) emissions and removal from the Land Use, Land Use Change and Forestry (LULUCF) sector, a long-term climate mitigation, greening of Common Agricultural Policy (CAP), Biodiversity Conservation, Urban Agenda and Energy Union.

Rationale

Challenges and needs:

- to integrate the data available in various databases to meet the needs of the national and European regulations,
- to assure the semantic consistency by harmonizing the data from different sources and across countries,
- there is limited knowledge on how useful are the Copernicus services and products for decision makers, reporting obligations, natural resources monitoring at the local, regional, national levels,
- there is a need for applied research linked to ongoing national programs to examine the fitness for use and demonstrate the benefits as well as the limitations of the CLMS data in this context.

InCoNaDa aim and objectives

Aim: to improve the user uptake of Land Cover / Land Use (LCLU) information derived from the integration of Copernicus Land Monitoring Service (CLMS) and national databases.

Objectives:

- to develop land cover and land change maps based on a time series of Sentinel-2 data using machine learning approaches;
- to verify the EAGLE concept based on interlinking LC and LU information and other landscape characteristics (CH) available at the country level;
- to design and develop web-based application enabling to query the LCLU database, generate statistics and land use information adjusted to the user needs in Poland;
- to examine the usefulness of CLMS for:
  - urban and spatial planning;
  - agricultural management;
  - environmental monitoring;
  - reporting GHG emissions and removals from LULUCF sector.

InCoNaDa - consortium

- Instytut of Geodesy and Cartography - Centre of Applied Geomatics (IGIK) (project promotor)
- Norwegian Institute of Bioeconomy Research (NIBIO)
- Institute of Environmental Protection - National Research Institute (IOS) - National Centre for Emissions Management (KOBiZE)
- Łódź University of Technology (LUoT) - Institute of Architecture and Urban Planning
- Eversis Sp. z o.o.

Duration of the project 1.10.2020 – 30.04.2024
funded by the Norway Grants via the National Centre for Research and Development, programme ‘Applied Research’, the POLNOR 2019 Call.

InCoNaDa + UA

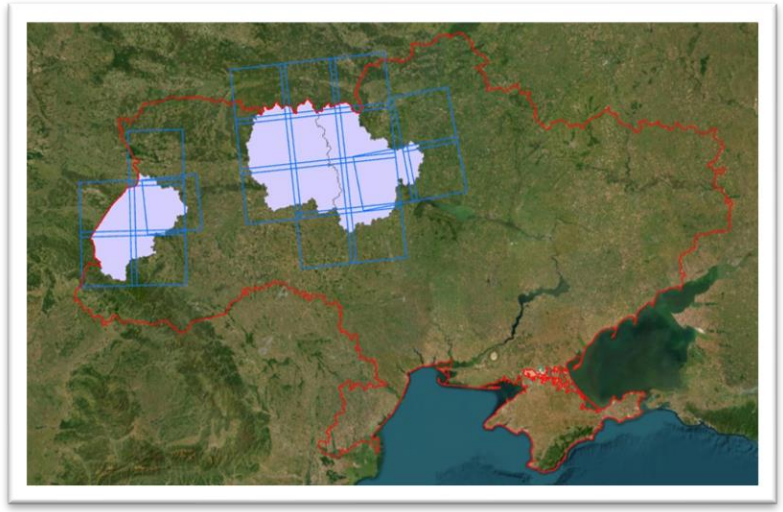
- Ukrainian National Forestry University, Ukraine

InCoNaDa study areas

Poland - Łódź Province

Norway - Viken county

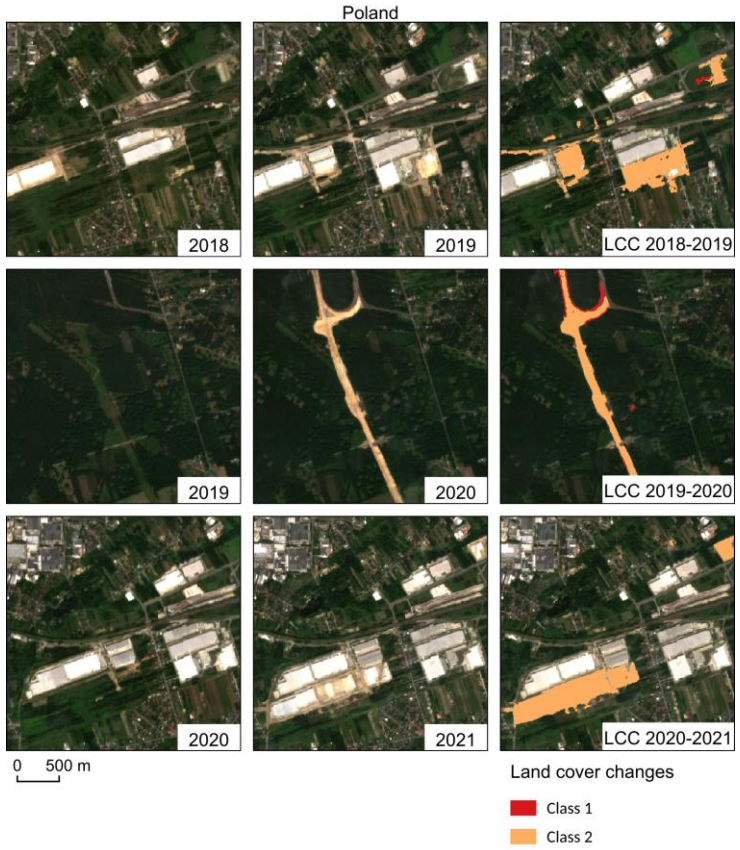
InCoNaDa+UA
Ukraine –
3 regions: Lviv, Kyiv, Zhytomyr

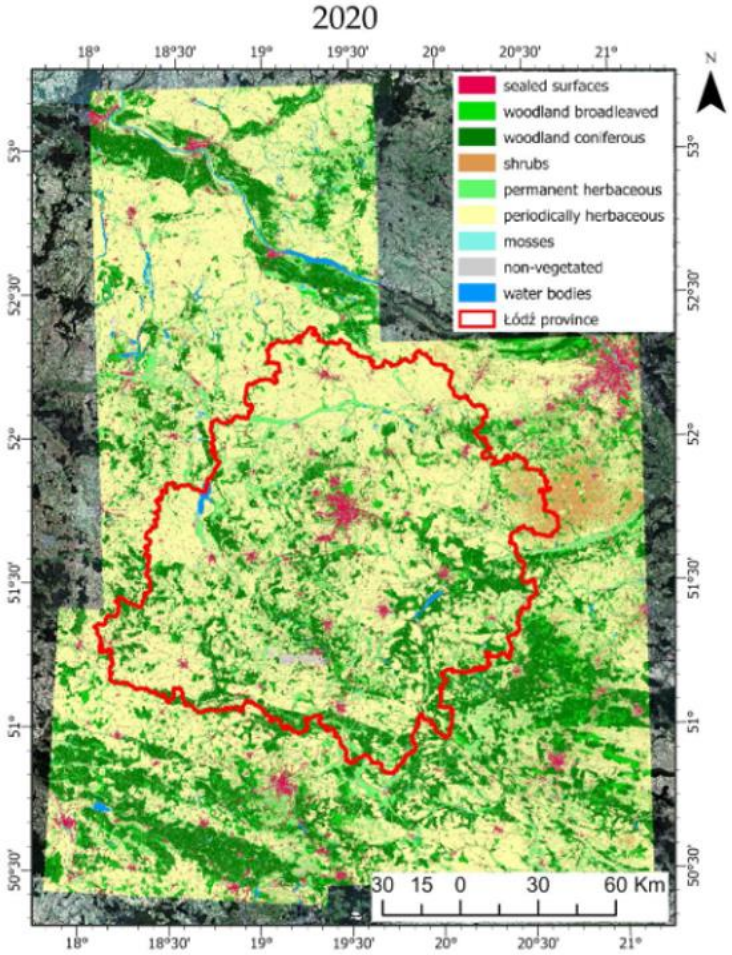


InCoNaDa work flow

WP1: Enrichment of the land cover, land use databases

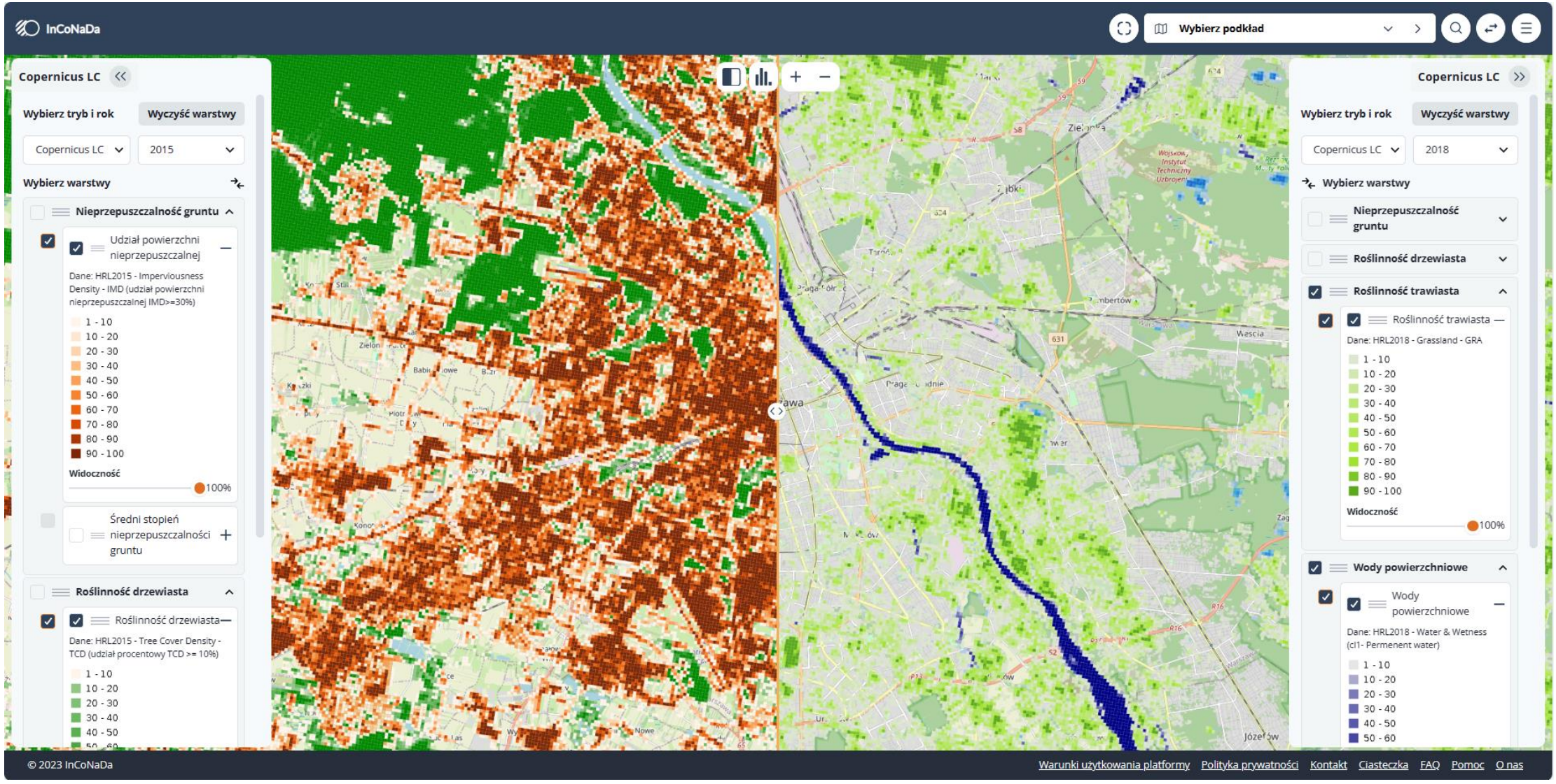
- developing the best possible automated land cover and land cover change maps based on a time series of Sentinel-2 – study areas in Norway and Poland
- integration of LCLU information derived from the CLMS products and national databases following the EAGLE concept.





InCoNaDa work flow

WP2: Developing a web-based application enabling the integration of LCLU data derived from the national databases and CLMS products for Poland.



InCoNaDa potential of CLMS products

Urban and spatial planning

- assessment of requirements of urban and spatial planning towards geospatial LCLU information,
- Urban Atlas, HR- Imperviousness for mapping and monitoring LC-changes,
- Urban Atlas - public access to green urban areas,
- HR – IMD for biologically active surfaces.

Agricultural sector

- supporting agricultural policy in Poland (under the CAP- Ecological Focus Areas) and national agricultural policy in Norway.
  - HRL Water and Wetness
  - HRL Small Woody Features
  - HRL Imperviousness
- **Land take analysis**
  - HRL Imperviousness / changes

Environmental monitoring

- mapping and monitoring biodiversity and wetland ecosystems - HRL Water and Wetness
- assessment of vegetation along streams and waterways – Riparian zones, HRL Small Woody Features
- mapping the high natural value grasslands in Norway – HRL Grasslands
- preparation of landscape audit in Poland – CLMS products

Reporting GHG emissions and removals from LULUCF sector

- review of the EU and national regulations related to reporting obligations in the context of land cover, land use and changes,
- assessment of the usefulness of CLMS products for reporting GHG emissions and removals from LULUCF

Achievements

Remote Sensing Applications: Society and Environment
Volume 32, November 2023, 101035

The impact of selection of reference samples and DEM on the accuracy of land cover classification based on Sentinel-2 data

Adam Waśniewski [a b], Agata Hościło [a], Linda Aune-Lundberg [c]

remote sensing

Article

Accuracy of the Copernicus High-Resolution Layer Imperviousness Density (HRL IMD) Assessed by Point Sampling within Pixels

Geir-Harald Strand

Spatial planning needs towards Copernicus Land Monitoring Services: Case studies from Poland and Norway

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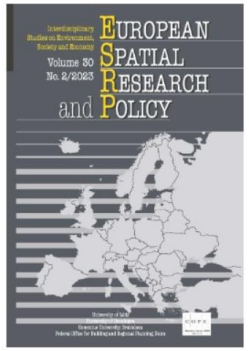
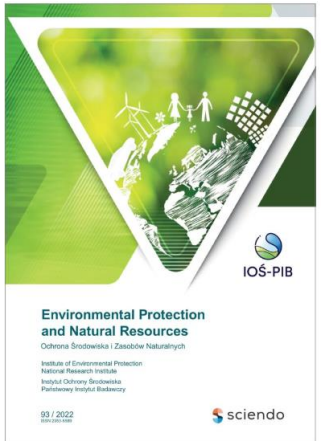




Open Access Article

Can a Hierarchical Classification of Sentinel-2 Data Improve Land Cover Mapping?

by Adam Waśniewski [1,2,*], Agata Hościło [1] and Milena Chmielewska [1]

[1] Centre of Applied Geomatics, Institute of Geodesy and Cartography, Modzelewskiego 27, 02-679 Warsaw, Poland

Fjellstad, W., Hościło A., Krøgli S.O.; Rizzi J.; Chmielewska M., **2024**, The potential of the Copernicus product Imperviousness Classified Change to assess soil sealing in agricultural areas in Poland and Norway. International Journal of Applied Earth Observation and Geoinformation, *under review*

Strand G-H. Solbjørg E., Heggem, F., Aune-Lundberg L., Agata Hoscilo A., Waśniewski A., Generalization and self-enrichment of a land cover map produced by classification of satellite imagery, **2024**. International Journal of Applied Earth Observation and Geoinformation, *under review*

Achievements

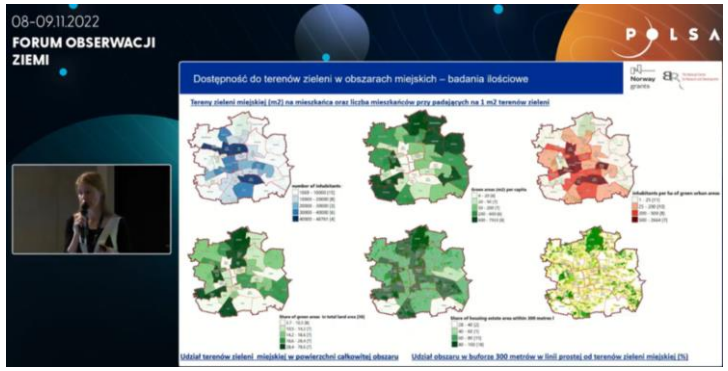
Norway grants

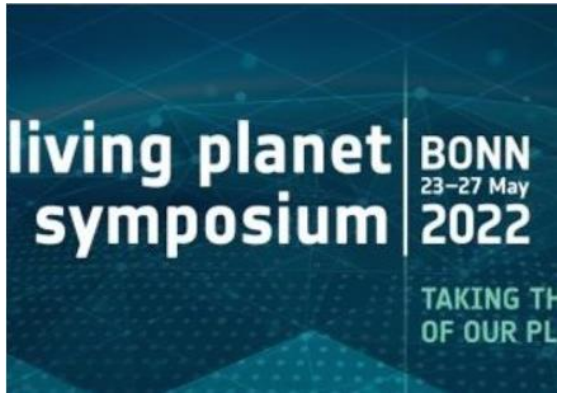
The National Centre for Research and Development

European Geosciences Union

16 - 21 JUNE 2024

3RD WORLD BIODIVERSITY FORUM





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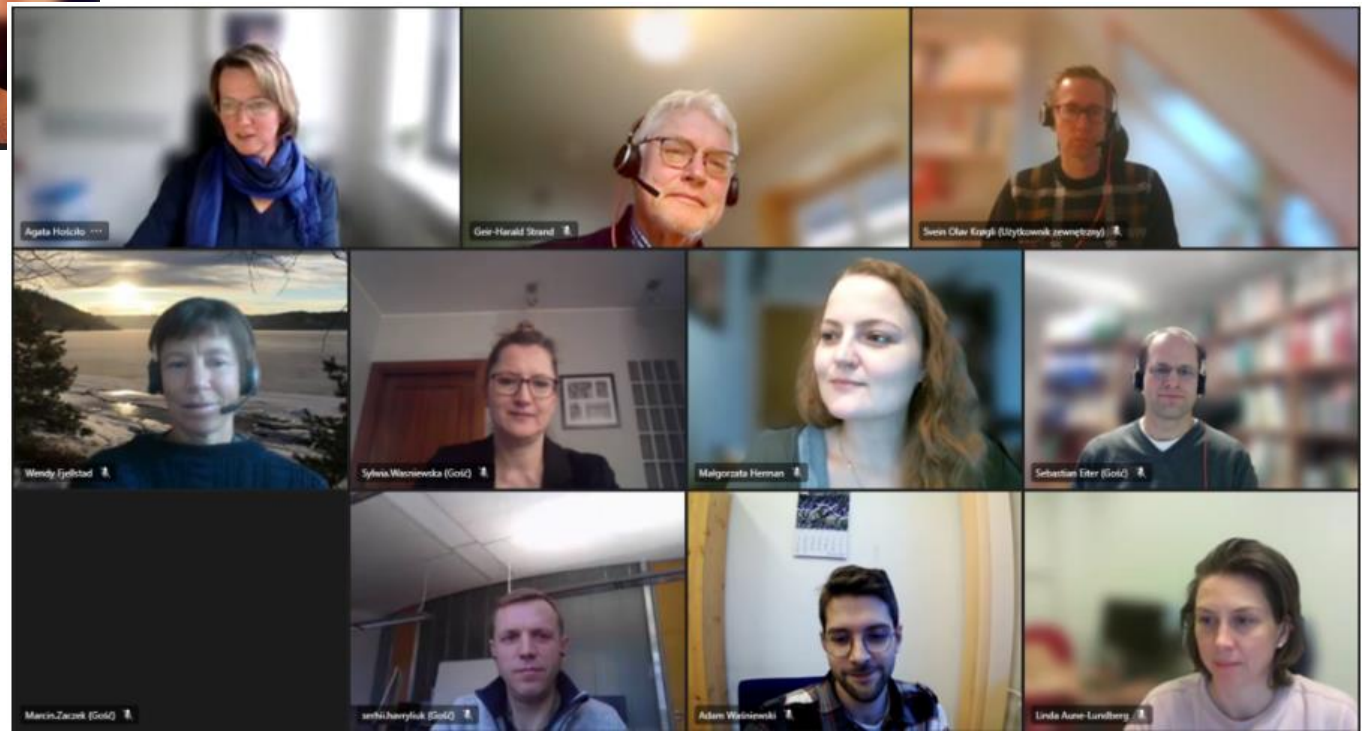

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European Environment Agency

National LCLU data providers:

The Agency for Restructuring and Modernisation of Agriculture (ARMA)

Head Office of Geodesy and Cartography (GUGiK)

Bank Danych o Lasach

Norway grants

The National Centre for Research and Development

Thank you for your attention

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