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”

WP3: LCLU for urban and spatial planning

The urban and spatial planning needs towards geospatial LC, LU and LU-change information in Poland and Norway

Monika Maria Cysek-Pawlak
Jakub Misiak
Institute of Architecture and Urban Planning, Lodz University of Technology (LUoT)

Geir-Harald Strand
Sebastian Eiter
Norwegian Institute of Bioeconomy Research (NIBIO)

Agata Hościło
Institute of Geodesy and Cartography (IGiK)

IGiK

NIBIO NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

IOŚ-PIB

Lodz University of Technology

EVERSIS

Introduction: Research Context

It is important to study **the user uptake of the CLMS products** and the **correspondence between systems and data provided by CLMS** as well as **the needs and requirements in the planning sector**.

The main purpose:	to identify the needs related to geospatial tools for urban and spatial planning in Poland and Norway
The hypothesis:	Copernicus Land Monitoring Service provides data that can support spatial planning activities, especially decision making processes and can provide accurate, reliable, and up-to-date spatial data on actual land use and land cover.

Introduction: aims and scope of research

The specific objectives of the study

- Analysis of national definitions, legends, and thresholds essential to fulfil the regulations and obligations of urban and spatial planners and verification of consistency with definitions used in the CLMS products;
- Examination of the usefulness of CLMS products in the planning system

Research Methods

- Review of national government, European and global handbooks and documents, analysis of source documents, legal acts, strategic and planning documents
- Professional experience and own observations regarding policies and local governments and design companies' experiences in the field of strategic programming and spatial planning
- Online questionnaire on the urban and spatial planning needs and recommendations towards geospatial LC, LU and LU-change information in Poland

Spatial scope

- Poland - Łódź Voivodeship - the city of Lodz
- Norway – Viken County – City of Oslo

Time scope

- Collection of materials and own research: 10.2020 - 03.2021

The system of spatial planning in Poland

The administrative division		planning documents	strategic documents
NATIONAL LEVEL: STATE GOVERNMENT ADMINISTRATION		None [Until November 2020: The National Spatial Development Concept 2030 (NSDC 2030)]	The National Strategy of Regional Development 2010-20
SELF-GOVERNMENT ADMINISTRATION	**REGIONAL LEVEL: VOIVODSHIP**	the voivodeship spatial development plans	The voivodship development strategies landscape audit
	SUPRA-LOCAL LEVEL: COUNTY	None	The supra-local (county) development strategies
	LOCAL LEVEL: MUNICIPALITY	•**The studies of conditions and directions of spatial development** (SUiKZP) •**Local spatial development plans** (MPZP)	**The local development strategies**

Basic Polish planning documents on local level

	A (local) study of conditions and directions of spatial development (SUiKZP)	A local spatial development plan (MPZP)
Objectives	A document which determines the directions of spatial development and the choice of spatial planning policy	A tool to implement municipal spatial planning policy which sets land-use, and rules and conditions for buildings and land cover
Legal status	**Not binding**	Binding (Act of local law)
Scale	1:5000 to 1:25 000	1:500, 1:1000 or 1:2000
Level of detail	**A morphological region / zone**	Plot / terrain / land use
Land-use division	**Not specified in detail**	Identified in detail
Other	**According to a strict planning procedure, both documents must be prepared based on Spatial Planning and Land Management Act; the project has to be agreed or opinioned by Committee for Urban Planning and Architecture, regional authorities and organisations, neighbouring municipalities, etc.**	

Land use	Colour and symbol
Single-family housing development areas	MN
Multi-family residential development areas	MW
Service development areas	U
Sport and recreation services	US
Commercial facilities with a sales area of more than 2,000 square meters	UC
Agricultural areas	R
arable farming, horticulture, animal husbandry and forestry and fishery	RU
Farm Buildings and Farmsteads	RM
Warehouse, manufacturing and logistics areas	P
Mining areas	PG
Green areas covered by legal forms of protection	ZN
Forests	ZL
Greenery areas, parks	ZP
Allotment gardens	ZD
Cemeteries	ZC
Flood Risk Areas	ZZ
sea surface waters	WM
Inland surface waters	WS
Public roads	KD
Internal road (private)	KDW
Technical infrastructure areas	E, G, W, K, T, O, C

The system of spatial planning in Norway

Administrative division	Planning documents	Strategic documents
NATIONAL LEVEL: State	• Central government land-use plan (NB: usually developed by municipalities, but commissioned by central government)	• Central government planning guidelines • Central government planning provisions
REGIONAL LEVEL: County (Norw.: fylke)	• Regional master plan (Mainly strategic, limited to a fixed period of time; not obligatory)	• Regional planning strategy (the only obligatory planning document on regional level) • Regional planning provisions (not obligatory)
LOCAL LEVEL: Municipality (Norw.: kommune)	• **Municipal master plan: Social element** (Kommuneplan, samfunnsdel) • **Municipal master plan: Land-use element** (Kommuneplan, arealdel) • **Area zoning plan** (Områderegulering) • **Detailed zoning plan** (Detaljregulering)	• **Municipal planning strategy** (obligatory to be renewed every electoral term (4 years))

Basic Norwegian planning documents on local level

	Municipal master plan (Norw.: kommuneplan)		Zoning plan (Norw.: reguleringsplan)	
	Social element	Land use element	Area zoning plan	Detailed zoning plan
Objectives	• Provide a long-term strategy for the societal development of the municipality: • Determine long-term challenges, goals and strategies, • Describe and assess alternative strategies, • Serve as the basis for sector plans	• Show the connection between future social development and land use, • State the main aspects of the allocation of land and frameworks and conditions governing which new projects and new land use may be implemented, as well as which important considerations must be taken into account when allocating land, • Show the main objectives and areas requiring special consideration in relation to the use and conservation of land	• Clarify land use in greater detail	• Follow up the land-use element of the municipal master plan and, in the event, any requirements established in an adopted area zoning plan
Legal status	Binding: basis for the municipality's own activities and for the activities of the central government and regional authorities in the municipality	Binding for new projects or the expansion of existing projects	Binding for new projects or extension of existing projects	Binding for new projects or extension of existing projects
Scale*	None (text document only)	Normally 1:20,000–1:50,000, exceptionally 1:5,000-1:10,000	Normally 1:5,000 or 1:10,000, exceptionally 1:20,000 or 1:50,000	Normally 1:1000-1:2000, exceptionally 1:500–1:5000
Level of detail	Sector level (infrastructure, housing, business activities, municipal services (health, schools, kindergartens, cultural services), environment etc)	Entire municipality:	Sub-section(s) of municipality	Construction project areas
Land-use division	None	Six land use categories (53 sub-objectives + 5 combined) and six kinds of consideration zones.	Six land use categories (186 sub-objectives + 25 combined), and 14 types of provisions	

planning documents on local level in comparison

Administrative level	Poland	Norway
National	• No documents • [Until November 2020: The National Spatial Development Concept 2030]	• Central government land-use plan (NB: usually developed by municipalities, but commissioned by central government)
Regional	• the voivodeship spatial development plans	• Regional master plan (Mainly strategic, limited to a fixed period of time; not obligatory)
Supra-local	• No documents	• No formal planning level with documents, however intermunicipal planning cooperation can be encouraged
Local	• the studies of conditions and directions of spatial development (SUiKZP) • local spatial development plans (MPZP) – legally binding documents • administrative decisions on development conditions	• Municipal master plan: Social element (Kommuneplan, samfunnsdel) • Municipal master plan: Land-use element (Kommuneplan, arealdel) • Area zoning plan (Områderegulering) • Detailed zoning plan (Detaljregulering)

Problems and challenges of geospatial information on land cover and land use

	Problems and challenges		Good practices
	Poland	**Norway**	
Time	• Lack of up-to-date datasets • No annual update	• Differences between datasets • Delayed and uneven updating • temporary changes may impact short-term area statistics	• Timely updating by municipalities (avoid delays and bulk updating) • Use correct time-stamp also when updating is done later than the actual change • Organize a central database where the municipalities can maintain/update their spatial data directly in the database • Provide municipalities with practical tools for updating • The national standard for geospatial data requires registration of data for measurement and for inclusion in database (existing in Poland and Norway)
Availability Accessibility	• a large proportion of designers and town planners unaware of existing geospatial databases • Not all spatial data and documents are digital • a lack of urban indicators important from the point of view of spatial planning documents (Green Area Ratio, Building Coverage Ratio, Floor Area Ratio)	• Data occasionally missing for some topics (e.g. green urban areas)	• Establish national geospatial data standards • List of data sets that is supposed to be used in spatial planning. • some data collections to be used without any restrictions by both the administration and commercial entities (GUGIK, Poland); • popularization of fields of study at universities such as: geoinformation, geodesy, spatial planning
Legibility	• not verry intuitive interface / unreadable legends – • No standards	• Some data providers are unable to provide product specifications, which results in differences among datasets • Planning documents may need to include brief map legends only, not full descriptions	• National spatial infrastructure obliges data owners to produce and submit standardised product specification and metadata (minimum unit, production method, classification system, etc.) • Make all product specifications available through a national geospatial data infrastructure portal
Consistency	• no application/tools that would integrate different spatial information from various databases (no standardisation and integration of currently scattered data in various databases) • too many simplifications for urban analyses	• Local data needs to be uploaded to the national database only annually; for valid data, local owner needs to be consulted • Inconsistency and uneven quality in CLMS data; makes it difficult to include in planning, e.g. imperviousness • Lack of registration, especially in environmental, incl. cultural heritage datasets, may be caused by actual absence of sites, or by lack of investigation/survey • Undocumented coverage	• Consistency ensured through assigning national responsibility for certain datasets and providing national databases, even if certain data itself may be owned by each municipality on its own • Geoportal - the basic mapping portal for the national spatial data infrastructure in Poland which integrates data from various sources
Functionality	• inability to obtain vector (editable) data (shapefile / .dwg) • majority of maps published in raster format with no geographic coordinate system and no attributes (databases) • lack of processed data (presenting, e.g. the amount of trees per inhabitant, access to green areas, population density/built-up area etc.) • lack of integration with data from on social processes • No possibility to compare the existing state with archival data • No possibility to generate simple statistics/ calculate urban indicators	• Municipal plans have often been available just as image files; however, its improving • Often difficult to compare with historical map data; e.g. aerial photos are added and also other historical maps; since ca. 10 years, annual copies of, for example, land resource map are taken care of. However, only few datasets so far. • Availability of datasets depends on national responsibility assigned to an authority	• Basically any data that exist are downloadable in vector format (incl. geographical coordinates) • Nationally standardised and compulsory file exchange format ("SOSI"); all providers of GIS software need to have an export/import tool • National statistics authority is member of geospatial data cooperation • Consultancies can buy map data packages related to spatial units • services based on National Geodetic and Cartographic Resources (WMS, WMTS…) • Availability of archival spatial data with Orthophoto maps and Topographic data • Geostatistics Portal with the cartographic presentation of data obtained in censuses

The national databases containing the LULC information

	CLMS products			Poland		Norway	
	Corine Land Cover (Level-3) National coverage	Urban Atlas LCLU 2018 Land Use Vector	HRL Imperviousness (IMD) The level of sealed soil	EGiB + bdot BDOT10K	MPZP – Local spatial development plan	Municipal Master Plan, Land-use Element	Comparison / Conclusions
Details	– Updated every 6 years (2006) MMU=25 ha MMU for changes 5 ha Scale 1:100 000	– Updated every 3 years (2006, 2012, 2018) – MMU class 1 = 0.26 ha – MMU class 2-5 = 1 ha	– 1-100%; updated every 3 years (2006, 2009, 2012, 2018) – MMU (2006-2012) = 20 by 20 m MMU (2018) = 10 by 10m – Change Layer	–	– Scale: 1:1000 (1:500, 1:2000)	– Update every 4 years or less frequent – Scale usually 1:5,000 or 1:10,000 for central areas, less detailed for rural areas.	
Artificial surfaces	– 111: Continuous urban fabric – 112: Discontinuous urban fabric	– 11100: Continuous Urban fabric (S.L. > 80%) – 11210: Discontinuous Dense Urban Fabric (S.L.: 50% - 80%) – 11220: Discontinuous Medium Density Urban Fabric (S.L.: 30% - 50%) – 11230: Discontinuous Low Density Urban Fabric (S.L.: 10% - 30%) – 11240: Discontinuous very low density urban fabric (S.L. < 10%)	– Housing areas (even with scattered houses)	– PTZB – development	– MN – Single-family housing development areas – MW – Multi-family residential development areas	– 1000/1001 Buildings and installations (1110 Housing)	no consistency Spatial planning in Poland and Norway is functional, and the provisions of planning documents relate to specific land uses. CLMS products and BDOT / EGIB refer to land coverage unless it is possible to link individual categories with the existing share of biologically active area (green area ratio), an obligatory urban indicator in local spatial development plans.
	–	– 11300: Isolated Structures	–	–	–	–	CLMS's Isolated artificial structures with a residential component can be a valuable source of information on current land use.

The urban and spatial planning needs and recommendations towards geospatial LC, LU and LU-change information in Poland and Norway – Online Survey (Questionnaire)

Badanie potrzeb planowania przestrzennego w odniesieniu do informacji geoprzestrzennych o pokryciu terenu i użytkowaniu ziemi

W ramach projektu realizowanego przez Politechnikę Łódzką "Zwiększenie wykorzystania informacji o pokryciu terenu i użytkowaniu ziemi pochodzącej z integracji danych i usług programu Copernicus i krajowych baz danych" zwracamy się do Państwa z uprzejmą prośbą o uzupełnienie ankiety. Państwa opinie są dla nas bardzo ważne w celu określenia potrzeb planowania przestrzennego w odniesieniu do informacji geoprzestrzennych o pokryciu terenu i użytkowaniu ziemi.

Projekt uzyskał finansowanie w konkursie POLNOR2019 ogłoszonym przez Narodowe Centrum Badań i Rozwoju (NCBiR) w ramach III edycji Funduszy Norweskich i EOG.

Z pozdrowieniami,
dr inż. arch. Monika Maria Cysek-Pawlak
mgr inż. Jakub Misiak (jakub.misiak@dokt.p.lodz.pl)

*Wymagane

online questionnaire - 13 questions

145 respondents

Time: from February 1 to February 28, 2021

Conducted among urban planners, architects, scientists, students…

Spatial planning needs concerning spatial data in Poland

Up-to-date, high-quality spatial databases

Integration of geospatial data with **data on social processes of the Central Statistical Office**

ability to **download/export vector data** (.shp / .dwg / .dxf format)

the **possibility of comparing the existing state with archival data**

generate simple statistics and calculate urban indicators for **the indicated area/quarter / registered plot**

broader and easier access to geospatial information

program support, increasing social awareness and educating planners

standardisation and unification of the presented data, definitions and concepts

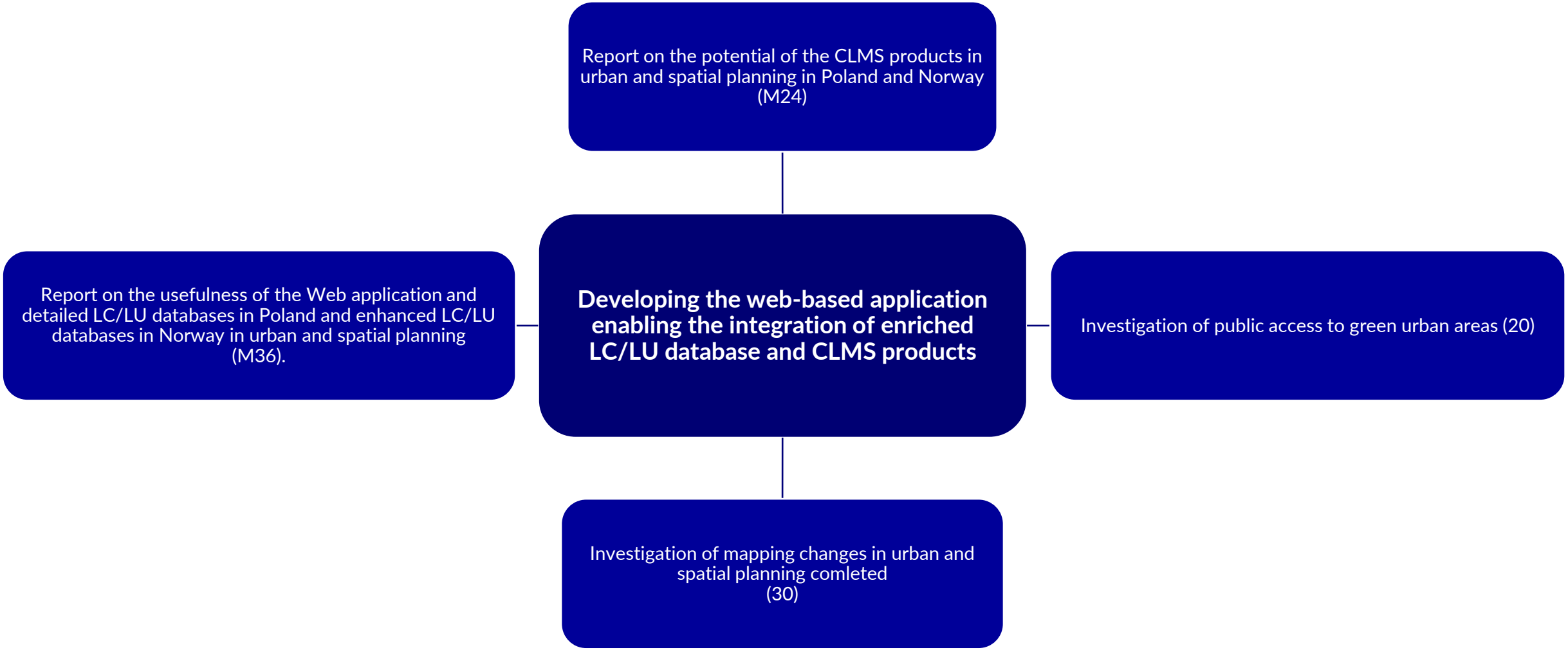
Conclusions

- At the EU policy level there is **no uniform rule concerning monitoring of LU/LC and its change**
- **Neither Norwegian nor Polish Planning and Building Act requires any specific monitoring of land cover or land use**
- We **could not identify any operative spatial planner or planning unit who employed CLMS** data in Norway and Poland
- the BDOT10k database is not a sufficient source for calculating the biologically active surface

- **The provisions** of planning documents relate to specific land uses in spatial planning in Poland and Norway.
- **CLMS products and BDOT / EGIB refer to land coverage** unless it is possible to link individual categories with the existing share of biologically active area (green area ratio), an obligatory urban indicator in local spatial development plans in Poland.

- CLMS products can be:
  - a source of information for **evidence-based decision-making** or to **verify to what extent the plan arrangements have been materialised**.
  - a source of knowledge for urban planners about **where urbanisation processes occur** and their level of advancement.
  - a source of information about the **development of space in the road delimiting lines** (share of individual surfaces in the street space – asphalt concrete/sidewalk/greenery).
- The open, **user-friendly geospatial data platform planned by InCoNaDa** should enable viewing, visualising, and analysing CLMS and national data.
- The application ought to include statistical and processed spatial data, which is helpful in effective spatial planning on a local level, is in line with these goals and needs.

WP3 – Future research avenues



Many thanks for your attention!

Monika Maria Cysek-Pawlak
monika.cysek@p.lodz.pl

Jakub Misiak
jakub.misiak@dokt.p.lodz.pl

Institute of Architecture and Urban Planning, Lodz University of Technology (LUoT)

Geir-Harald Strand
Geir.Harald.Strand@nibio.no

Sebastian Eiter
sebastian.eiter@nibio.no

Norwegian Institute of Bioeconomy Research (NIBIO)

Agata Hościło
agata.hoscilo@igik.edu.pl

Institute of Geodesy and Cartography (IGiK)

'The research leading to these results has received funding from the Norway Grants 2014-2021 via the National Center for Research and Development'