



This project is funded by the European Union

## ENI SEIS II East

Implementation of the Shared Environmental Information System (SEIS) principles and practices in the ENP East region

# Regional Conference on the outcome of the CLC-Pilot project, potential benefits and way forward in ENI-East countries

## *Republic of Moldova*

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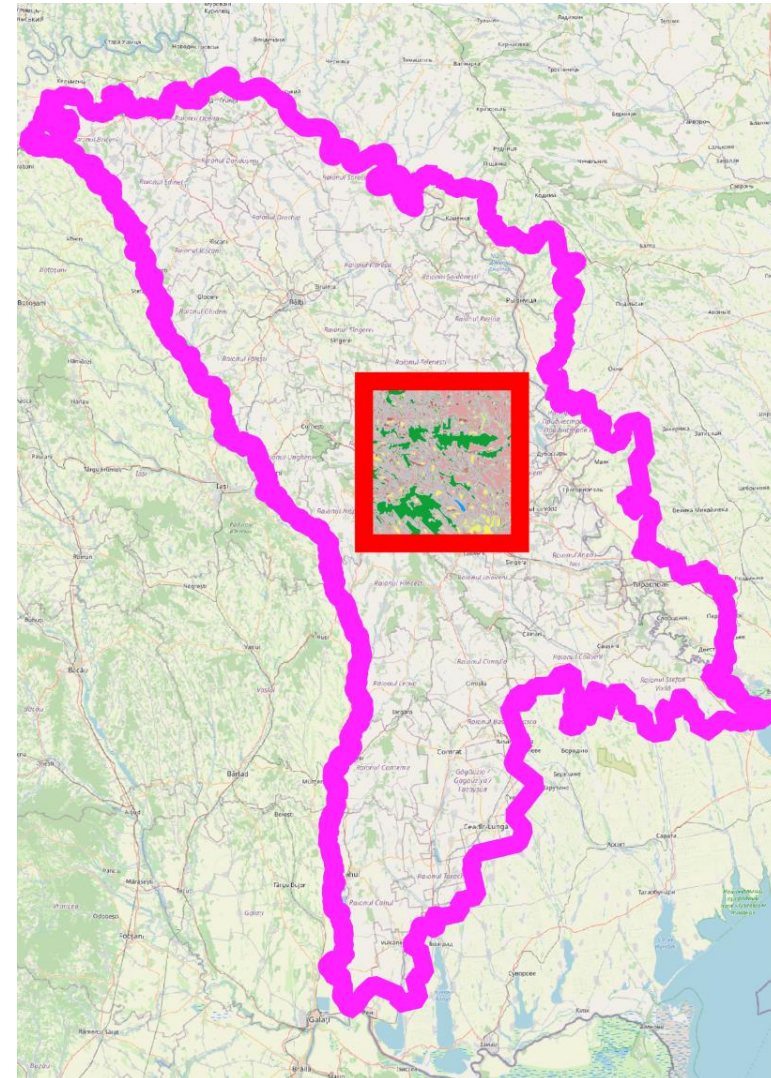


# 1. Steps of implementing the CLC-pilot (1/2)

**CLC pilot project area:** Chisinau urban area and its surroundings - **3158 km<sup>2</sup>** (10% out of the total country area);

**Databases used:**

1. **CLC2000\_MD** dataset;
2. **Satellite imagery:** four high resolution (HR) satellite image coverage IMAGE2018 taken by the ESA Sentinel-2 satellite in 2017 and 2018, selected and prepared by ETC-ULS partner BFKH were available for the project to cover the pilot area;
3. **In-situ data:** Topographic maps (2000-2012) and ortho-photos 2007/2016.



# 1. Steps of implementing the CLC-pilot (2/2)

1. **Training of the NIT** by the European Topic Centre on Urban, Land and Soil systems (ETC/ULS) in partnership with the Copernicus Programme (09-12 July 2019);
2. **Mapping the CLC status layer** for the pilot area; due to the special situation in the Republic of Moldova (the CLC 2000 status layer exists) instead of mapping a status layer, the CLC 2000 layer was revised and corrected by ETC/ULS;
3. **Quality control:** internal control by the leading photo-interpretors and external by ETC ULS for the CLC-Changes and CLC2018



## 2. Main results of the CLC-pilot (1/3)

✓ CLC\_2000

(revised/corrected);

✓ CLC-Change layer

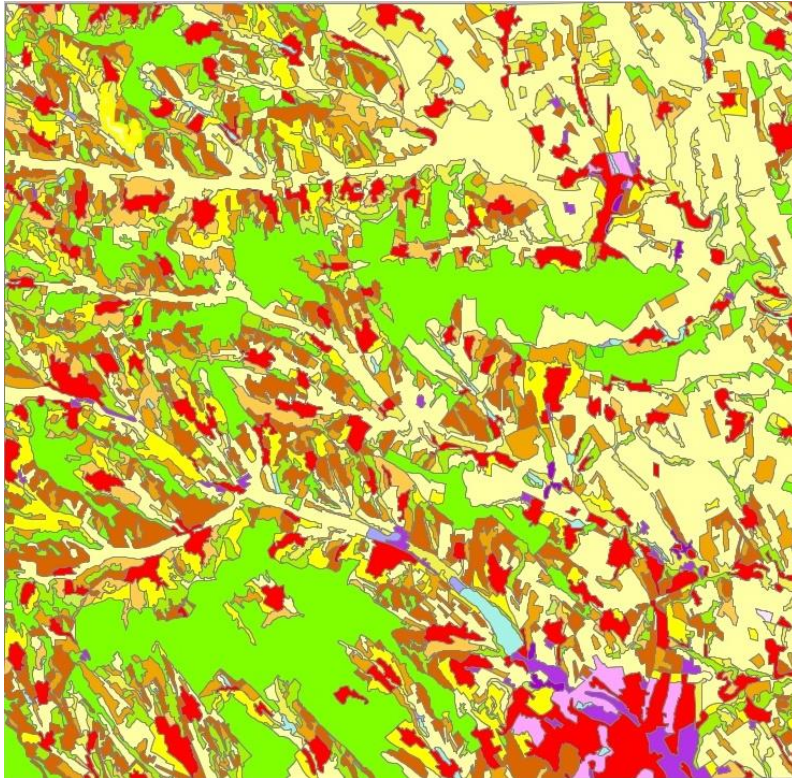
✓ CLC\_2018

- The main land cover in CLC pilot project in Moldova covers agricultural lands (pastures, arable land and complex cultivation patterns (62.2%)). However, the surface area occupied by urban areas has increased to 11.5%. Land classified as semi-natural and forest areas occupies around 24.2% of the pilot territory.
- The total area that has changed its land cover between 2000 and 2018 is 1.07% within the pilot territory, meaning that land cover in Moldova is relatively stable in CLC resolution.
- The largest increase is observed in gardens, plantations of fruit trees converted into arable land and from arable land to gardens, plantations of fruit trees. The majority of artificial surfaces classes increased between 2000 and 2018.
- The largest net area increase was observed in the orchards, fruit-tree plantations (222), followed by the non-irrigation arable land (211) and discontinuous urban fabric (112).



# 2. Main results of the CLC-pilot (2/3)

## CLC-changes (2000-2018)



Revised CLC2000



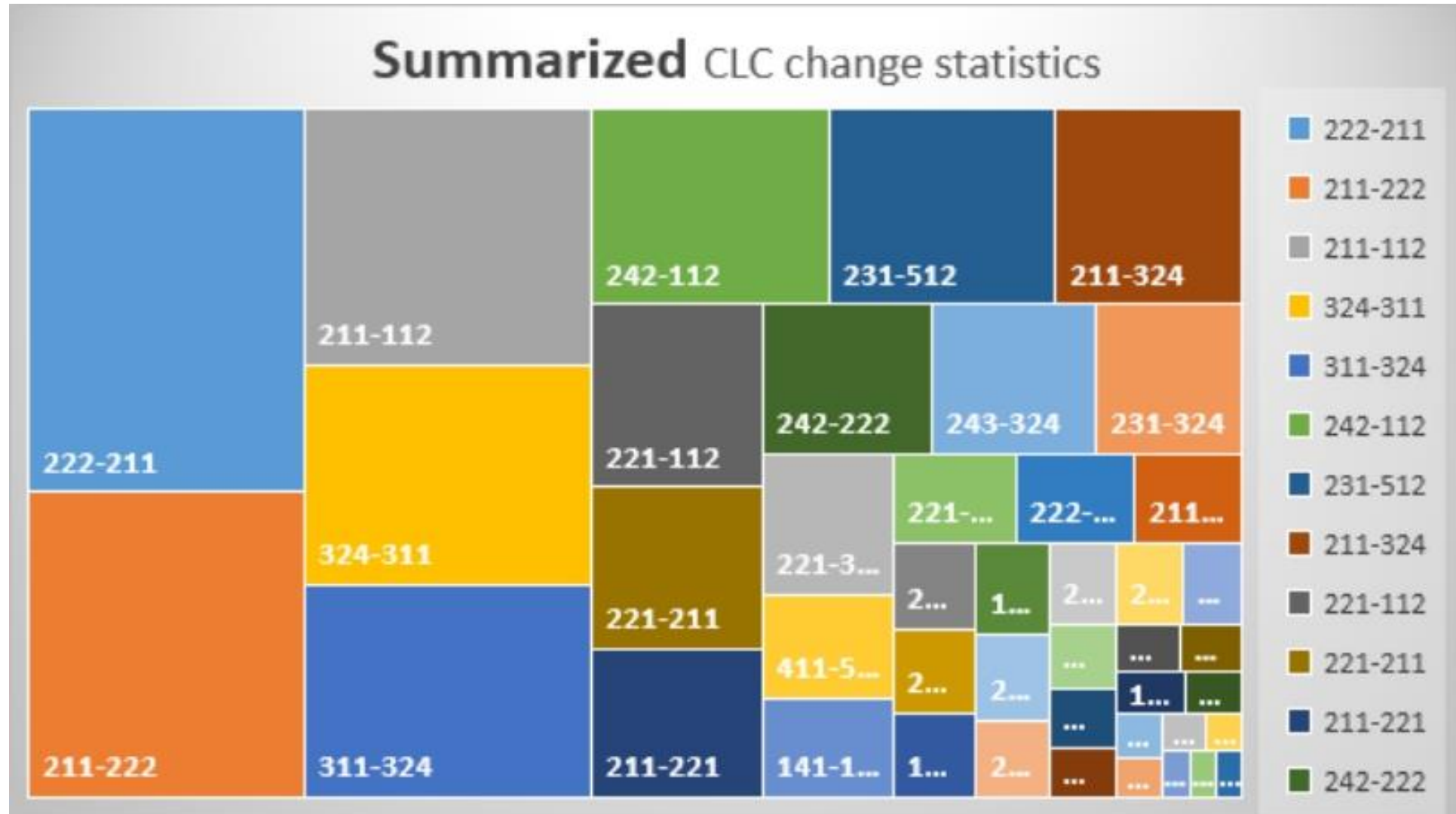
CLC-Change (2000-2018)

code	No of polygons	Area ha	Percent of total
112	185	33115,77	10,49%
121	36	3126,82	0,99%
131	8	536,99	0,17%
141	10	2380,73	0,75%
142	1	62,64	0,02%
211	226	95087,49	30,11%
221	224	29993,98	9,50%
222	298	23644,19	7,49%
231	207	17039,33	5,40%
242	157	19681,66	6,23%
243	111	11027,67	3,49%
311	101	57730,27	18,28%
313	1	58,91	0,02%
321	9	856,31	0,27%
324	221	18560,72	5,88%
333	6	246,68	0,08%
411	8	474,71	0,15%
512	36	2154,42	0,68%
Sum	1845	315779,26	100,00%

## CLC2018 statistics



## 2. Results of the CLC-pilot (3/3)



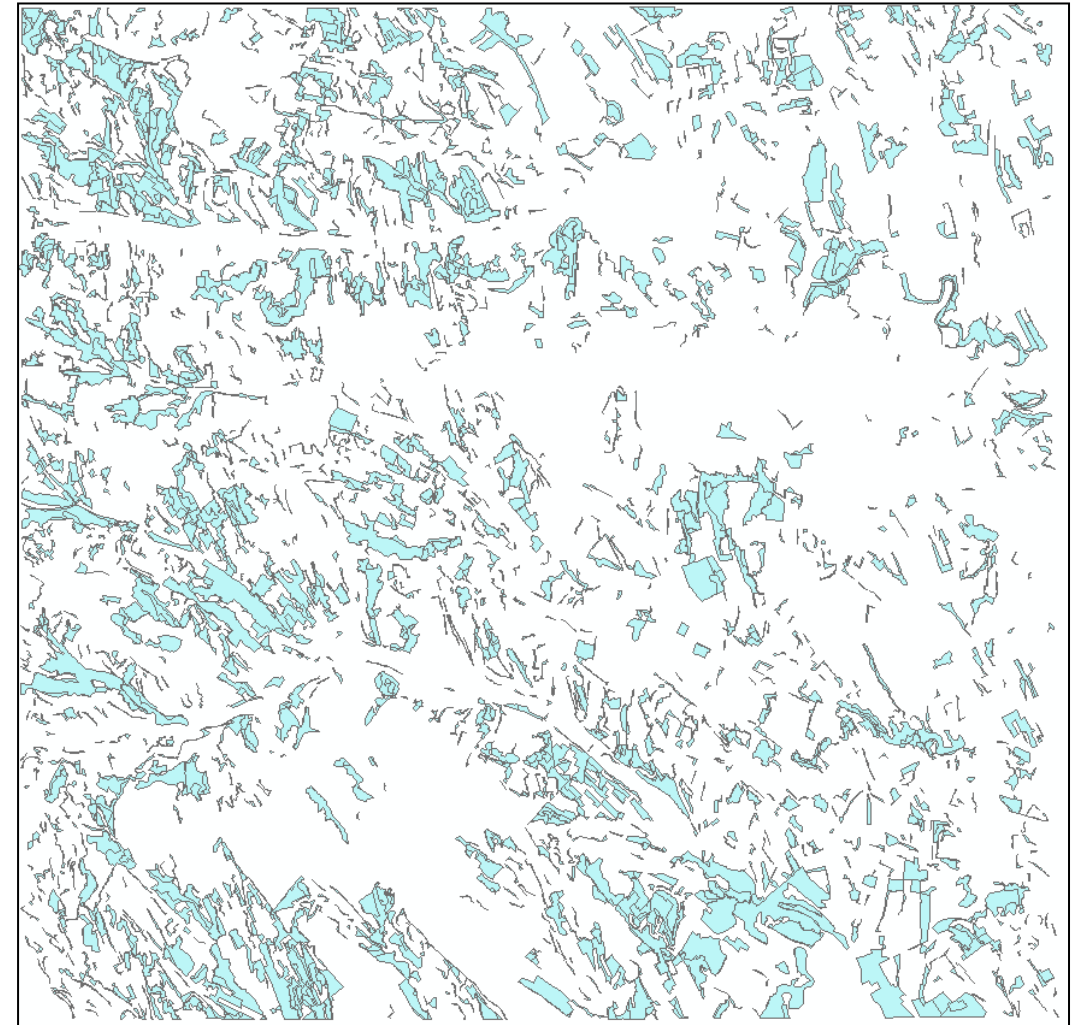
# 3. Difficulties encountered in realising the CLC-pilot

The main difficulties during the pilot project implementation were the following:

CLC 2000 revision took longer time than was planned.

Reasons:

- 1) necessity to create additional polygons with areas more than 25 hectares (1599 old data/ 1838 new data) – 15% polygons where added.
- 2) the need for boundary corrections (shift greater than 100 meters) 46.30% of vertex were changed, 17.98% were deleted.
- 3) the need to re-group and analyse the shape of polygons.
- 4) correction of topology errors.



*Revision changed areas*



# 4. Visibility and communication (1/3)

1. A Case Study was published on ENI SEIS website and Environment Agency's website and social media account on CLC development, results and future action in Moldova:

- <https://eni-seis.eionet.europa.eu/east/governance/results/case-studies/the-corine-land-cover-clc-pilot-is-successfully-completed-and-published-in-the-republic-of-moldova>
- <http://www.mediu.gov.md/ro/node/530>
- [https://www.facebook.com/notes/agen%C8%9Bia-de-mediu/setul-de-date-corine-land-cover-clc\\_2018-acoperirea-terenurilor/572270976732094/?\\_tn\\_ =HH-R](https://www.facebook.com/notes/agen%C8%9Bia-de-mediu/setul-de-date-corine-land-cover-clc_2018-acoperirea-terenurilor/572270976732094/?_tn_ =HH-R)



**ENI SEIS II East**  
Implementation of the Shared Environmental Information System (SEIS) principles and practices in the ENP East region

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YOU ARE HERE: > HOME > ABOUT > RESULTS > CASE STUDIES > CORINE LAND COVER PILOT IS SUCCESSFULLY COMPLETED AND PUBLISHED IN THE REPUBLIC OF MOLDOVA

## CORINE Land Cover pilot is successfully completed and published in the Republic of Moldova

Countries: Moldova

CORINE Land Cover (CLC) inventory was successfully completed in the Republic of Moldova for 2018. CLC refers to a standardized data collection methodology on land cover to support environmental policy development in the countries. It provides information on the biophysical characteristics of European land cover and beyond based on Earth observation satellite data.



Land is a finite resource: how it is used constitutes one of the principal drivers for environmental change, with significant impacts on ecosystems and quality of life. In extreme cases, such changes might lead to unhealthy and degraded lands.-The CLC data set is one of the basis of EU initiatives for sustainable soil and land management. It contributes to a wide range of studies e.g.: ecosystem mapping, modelling the impacts of climate change, landscape fragmentation by roads, abandonment of farmland and major structural changes in agriculture, urban sprawl, water management.

In Moldova's case it can serve as a tool for monitoring the UN Sustainable Development Goals and especially Goal 15: Life on land. SDG 15 targets ecosystems that are highly relevant for the Republic of Moldova, including forests and land.



Ministerul Agriculturii, Dezvoltării Regionale și Mediului  
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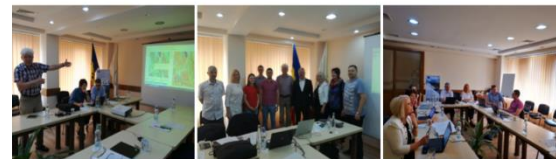
Setul de date Corine Land Cover (CLC\_2018) – Acoperirea terenurilor

[Anexa 1\\_CLC2000\\_2018\\_final\\_Report\\_Moldova](#)

[Anexa 2\\_Technical\\_specifications\\_CLC\\_pilots\\_ENI-East](#)

În cadrul proiectului ENI SEIS II East "Sistem Partajat de Informații privind Mediul", au fost finalizate activitățile ce țin de actualizarea setului de date privind acoperirea terenurilor prin metodologia CORINE Land Cover (CLC) - Coordinated Information on the European Environment/Informații de Mediu Coordonate pentru Europa. Aceasta reprezintă un sistem de clasificare armonizat la nivel european care are scopul să furnizeze informații despre caracteristicile fizice ale suprafeței terestre sub formă de date spațiale și hărți vectoriale digitale ale acoperirii reale a terenurilor. În acest fel, sunt difuzate datele privind utilizarea terenurilor care se referă la destinația terenului. CLC este un serviciu oferit prin programul european de monitorizare a pământului – Copernicus.

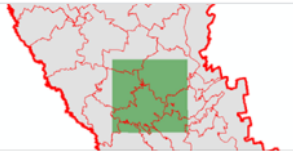
Setul de date privind stratul de acoperire a terenurilor stă la baza tuturor inițiativelor UE de gestionare durabilă a solurilor, terenurilor și reprezintă, de asemenea, un instrument de monitorizare a Obiectivelor de Dezvoltare Durabilă și mai cu seamă Obiectivul 15: Viața pe pământ care se referă la ecosisteme, inclusiv pădurile și solul.



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Setul de date Corine Land Cover (CLC\_2018) – Acoperirea terenurilor

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Acesta reprezintă un sistem de clasificare armonizat la nivel ...

See more

European Environment Agency





# 4. Visibility and communication (2/3)

2. **Article** on CLC training in the Republic of Moldova delivered by the experts from the European Topic Centre of Urban, Land and Soil Systems (ETC-ULS), 9-12 July: <https://eni-seis.eionet.europa.eu/east/areas-of-work/communication/newsletter/9-12-july-2019-corine-land-cover-training>

Article on CLC training in Romanian published on:

3. Environmental Agency's website:

<http://www.mediu.gov.md/ro/content/atelier-de-instruire-privind-actualizarea-bazei-date-corine-land-cover-clc2018-pentru>

4. National Geospatial data fund website:

<https://geoportal.md/ro/mobile/news/detailed/id/109>

5. Agency for Land Relations and Cadastre social media:

[https://www.facebook.com/permalink.php?story\\_fbid=2796734963730399&id=464711863599399&\\_tn=-R&rdc=1&rdr](https://www.facebook.com/permalink.php?story_fbid=2796734963730399&id=464711863599399&_tn=-R&rdc=1&rdr)

6. Agency for Land Relations and Cadastre website:

<http://www.arfc.gov.md/node/702>



## ENI SEIS II East

Implementation of the Shared Environmental Information System (SEIS) principles and practices in the ENP East region

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### 9-12 July 2019 | Corine Land Cover training in the Republic of Moldova

**Countries:** Moldova

The training is organized by the European Environment Agency and delivered by the experts from the European Topic Centre of Urban, Land and Soil Systems (ETC-ULS) in partnership with the the EU Earth Observation and Monitoring Program (Copernicus Programme). Corine Land Cover (CLC) datasets provided a time series of land cover and land use information across Europe since 1990. These data sets allow monitoring changes to the Earth's surface that result from the interaction of natural processes and human activities.

The Republic of Moldova is a special case with a previously produced 2000 CLC layer for the entire country. The ETC/ULS carried out a quality check/verification on the 2000 data set (in 2018), and the training will discuss the 2000 data plus the land cover change methodology in view of updating the 2000 data to map changes between 2000 and 2018/2019.



Visibility of the event is shared by [Agency for Land Relations and Cadastre](#) | [National Geospatial Data Fund](#) | [Agency for Land Relations and Cadastre](#) | [Environmental Agency](#)

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# 4. Visibility and communication (3/3)

The screenshot displays the Geoportal INDS interface. On the left, a sidebar contains filters for Service (2), INSPIRE THEMES (Land cover (4)), PROVIDED BY (Dac139d4-147d-49a2-8... (4)), YEARS (2019 (2), 2000 (2)), FORMATS (ESRI Shapefile (2)), REPRESENTATION TYPES (Vector (2)), UPDATE FREQUENCIES (Irregular (2)), SERVICE TYPES (OGC:WMS (2)), SCALE (1/100000 (2)), and RESOLUTIONS (100 m (2)).

The main content area shows four search results:

- Acoperirea terestră 2000**: A thumbnail map showing land cover data for 2000. Description: "Datele CORINE Land Cover (CLC) oferă informații despre caracteristicile fizice ale suprafeței pământului, pentru zona centrală a Republicii Moldova, elaborată cu suportul Agenției Europene de Mediu. CLC-Change2000 a fost produsul principal al proiectului CLC2000. Scopul era de .a Î.S.,,INGEOCAD". Format: ARFC.
- Acoperirea terestră 2018**: A thumbnail map showing land cover data for 2018. Description: "Datele CORINE Land Cover (CLC) oferă informații despre caracteristicile fizice ale suprafeței pământului, pentru zona centrală a Republicii Moldova, elaborată cu suportul Agenției Europene de Mediu. CLC-Change2000-2018 a fost produsul principal al proiectului CLC2018. Scopul era de .a Î.S.,,INGEOCAD". Format: ARFC.
- Acoperirea terestră 2000, WMS**: A thumbnail map with a "WMS" label. Description: "Serviciu Web Mapping Service (WMS) care permite vizualizarea datelor spațiale CORINE Land Cover (CLC), pentru regiunea de centru a teritoriului Republicii Moldova". Format: ARFC.
- Acoperirea terestră 2018, WMS**: A thumbnail map with a "WMS" label. Description: "Serviciu Web Mapping Service (WMS) care permite vizualizarea datelor spațiale CORINE Land Cover (CLC), pentru regiunea de centru a teritoriului Republicii Moldova". Format: ARFC.

The bottom of the page includes links for "About", "Github", and "Powered by geonetwork 3.0.4.0".

*Metadata  
publication  
on the national  
geoportal*



<http://www.geoportalinds.gov.md/>

# 5. Potential use of CLC in the country (1/2)

**Users: Ministry of Agriculture, Regional Development and Environment and subordinated authorities, Ministry of Infrastructure and Economy, National Bureau of Statistics, Academy of Science, Land Relations and Cadastre Agency;**

Planned activities:

- ✓ Water: River Basin Management Plans; risk assessments of surface water bodies; Water catchment modelling;
- ✓ Biodiversity: Protected area management and monitoring, natural resources monitoring system development (Environment Agency), forestry management and monitoring changes Land and soil: land management and assessment, soil degradation/erosion monitoring;
- ✓ Spatial planning: development of the National Spatial Planning Plan/Land-use Plan (*municipalities, road infrastructure, water supply network, electricity, natural gas, protected areas, natural risk areas, areas with tourist resources, protected areas, etc.*)



# 5. Potential use of CLC in the country (2/2)

- ✓ Environment assessment: land accounting, land indicators, SDGs Targets, Environmental Strategic Assessment (SEA) and Environmental Impact Assessment (EIA), disaster risks/climate vulnerability assessments, etc;
- ✓ International country reporting obligations: the Land use, land-use change, and forestry (LULUCF), as defined by UNCCC and United Nations Convention to Combat Desertification (UNCCD);
- ✓ National Spatial Data Infrastructure: Land cover spatial data is foreseen in the national regulation but not yet available except CLC for 10% of territory (*Land Relations and Cadastre Agency plans to implement the EU Twinning project (2<sup>nd</sup> phase) for improving Spatial Data Services in the Republic of Moldova following EU standards (INSPIRE), 2020-2022*)



# 6. Plans for continuation of CLC mapping

✓ CLC mapping for the whole territory:

- National dialogue with the main stakeholders (potential users and the National Implementation Team) to finalise a project proposal for CLC extension for the entire country area;

*Responsible:*

Ministry of Regional Development, Agriculture, Environment,  
Environment Agency, Land Relations and Cadaster Agency



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**Thank you for your attention!**