

EO 4 Ecosystem Accounting 2022

INCA TOOL: EO DATA GAPS CHALLENGES FOR FUTURE ECOSYSTEM ACCOUNTS - CASE STUDY ON SOIL RETENTION

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INCA TOOL: SOIL RETENTION



INCA

Edit metadata Run Continue existing run

Working directory D:\workspace_plugin

Study Scope

Year 2012

Data areas

☒ NUTS-2021 regions NUTS-0

☐ Custom shape

Reporting areas

☒ NUTS-2021 regions NUTS-2

☐ Custom shape

Selected regions BE10, BE21, BE22, BE23, BE24, BE25, BE31, BE32, BE33, BE34, BE35

Deflator table D:\workspace\deflator_table.csv

Land cover map e:\LandCover_Corine_INCA-AOI\CLC2000ACC_V2018_20_INCA_100m_EPSG3035.tif

Ecosystem translation INCA default mapping for CORINE data

Where all **outputs** will be stored

Reporting year

Area covered by input data

Reporting area

Fixed inputs for ES

6 ES selection
7 Folder for **outputs of current model run**

8 **Biophysical inputs (RUSLE)**

9 **Monetary valuation inputs**

Inputs adjust according to the ES selected

Ecosystem Service Soil Retention

Run name soil_retention_beta3

Biophysical

C-Factor ace\soil_retention\input_model\annual_c_factor\cfactor2000_INCA.tif

K-Factor _model\ESDAC_RUSLE_data\K_new_filled_INCA_100m_EPSG3035.tif

LS-Factor SDAC_RUSLE_data\EU_LS_Mosaic_100m_INCA_100m_EPSG3035.tif

P-Factor :SDAC_RUSLE_data\EU_PFactor_V2_filled_INCA_100m_EPSG3035.tif

R-Factor nput_model\ESDAC_RUSLE_data\Rf_gp1_INCA_100m_EPSG3035.tif

Average soil formation factor 1,40

Monetary

Topsoil N content ention\input_model\LUCAS_nutrient_content\W_INCA_100m_EPSG3035.tif

N content scaling 1000,00

Topsoil P content ention\input_model\LUCAS_nutrient_content\P_INCA_100m_EPSG3035.tif

P content scaling 1000000,00

Retention rate model\retention_rate\retention_rate_AOI-EU28-2016_100m_EPSG3035.tif

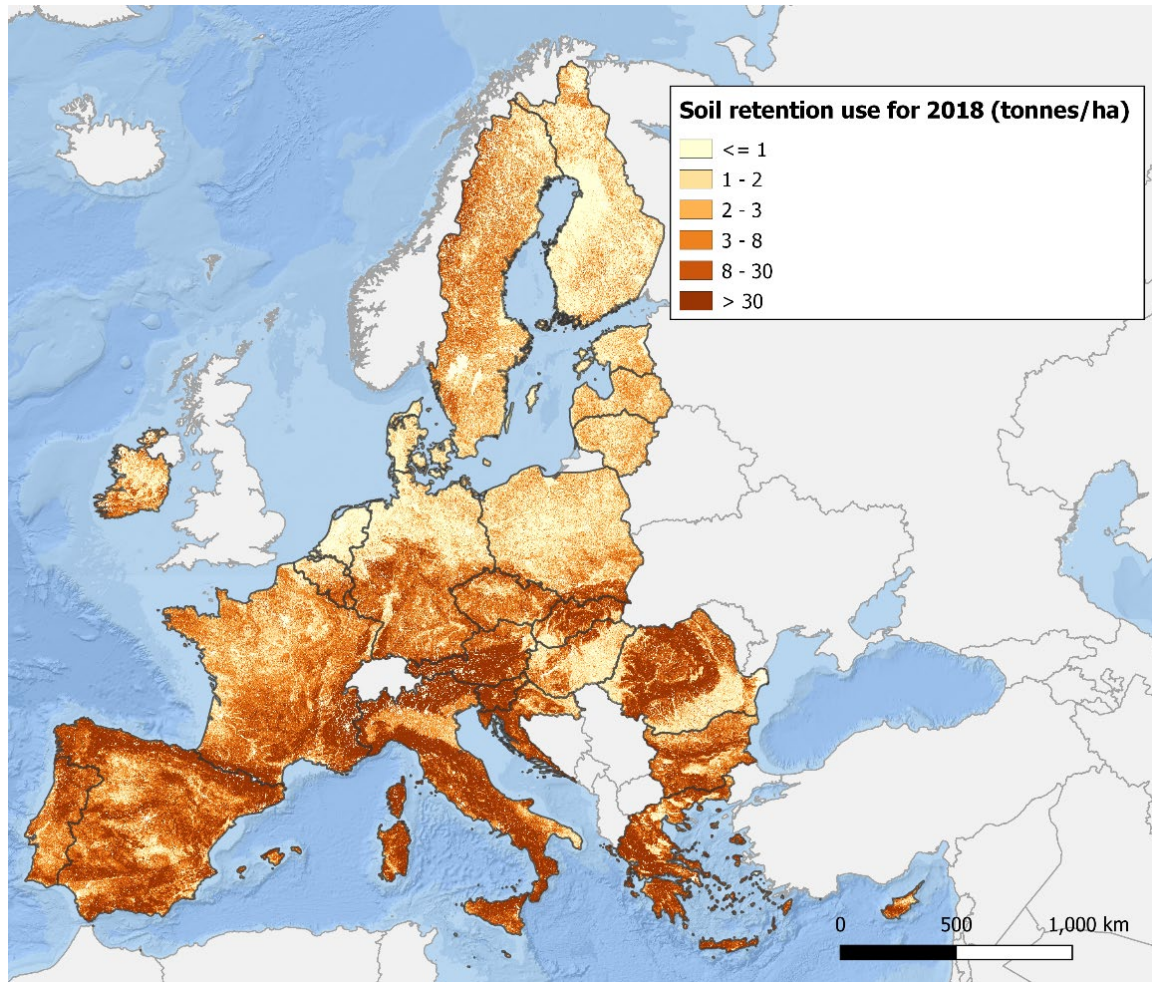
Average nutrient prices ut_model\Look_up_Tables\annual_average_nutrient_prices_20211019.csv

Bulk soil price ention\input_model\Look_up_Tables\annual_bulksoil_prices_20211015.csv

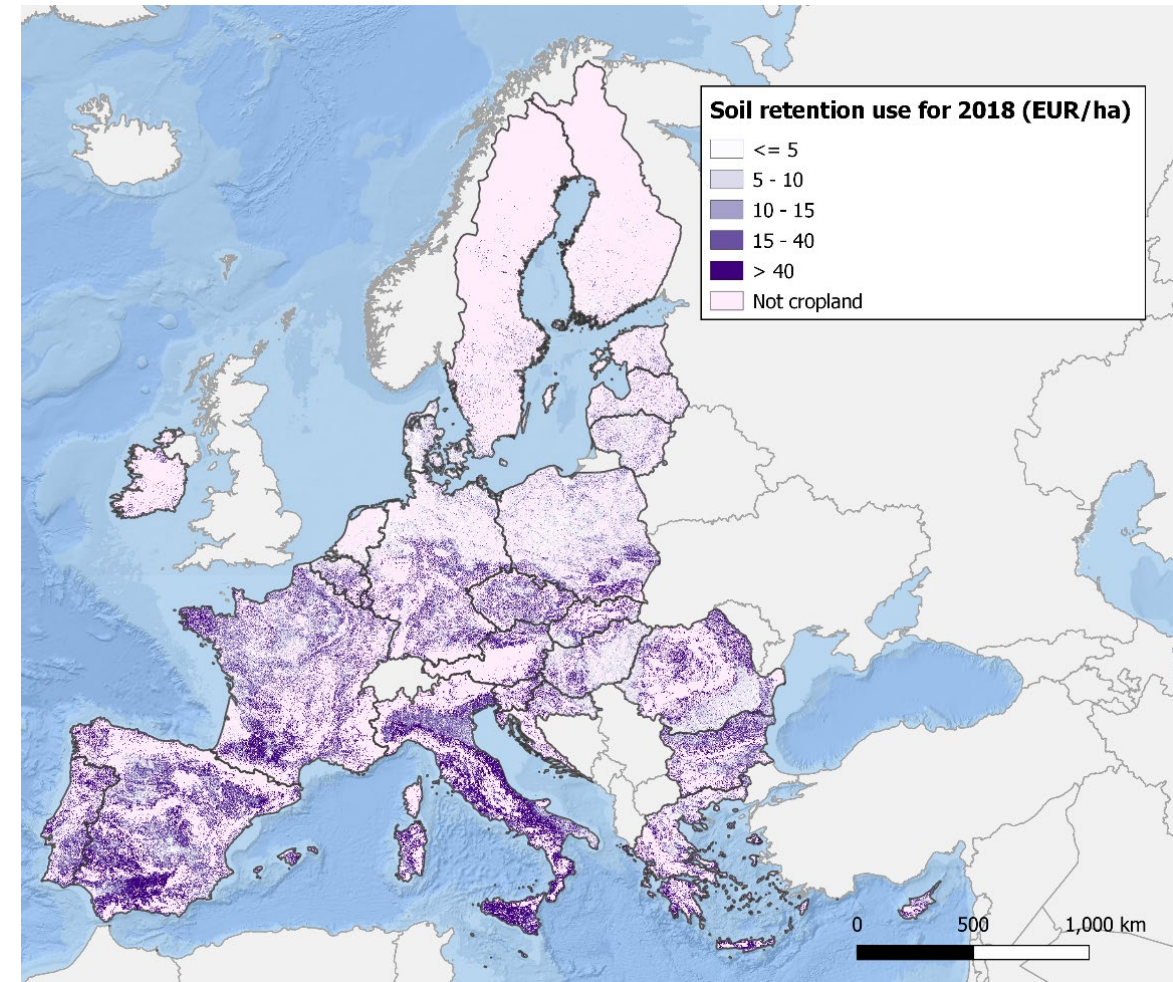


OUTPUT MAPS FROM INCA TOOL FOR SOIL RETENTION

Use in biophysical terms



Use in monetary terms



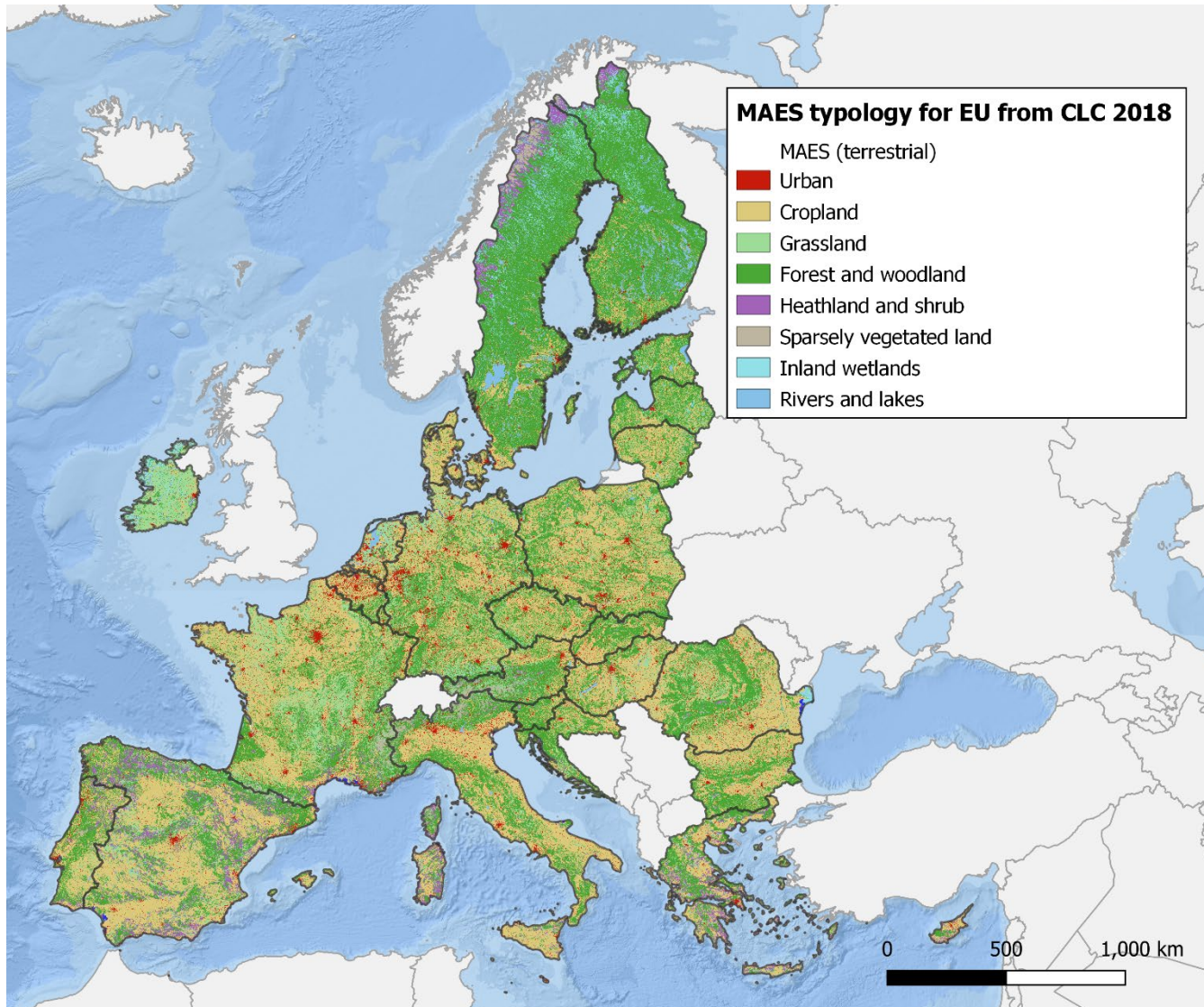
3

USE 2018															Total
Economic Unit						Type of ecosystem unit									
Primary sector		Secondary Sector	Tertiary sector	Households	Global Society	Urban	Cropland	Grassland	Woodland and forest	Heathland and shrub	Sparsely vegetated land	Wetlands	Rivers and lakes	Coastal / intertidal	
Agriculture	Forestry														
soil retention															
1000 metric tonnes year 2018															
AT	24,567					59		151,224	421,934	33,939	22,162				653,885
BE	6,135					35		2,759	12,073	76	-				21,080
BG	39,437					38		17,618	166,707	1,555	842				226,198
CY	3,778					3		489	12,039	4,426	132				20,868
CZ	22,945					69		9,597	61,654	72	9				94,346
DE	52,048					189		61,132	228,480	2,656	351				344,857
DK	3,519					23		105	1,364	42	0				5,053
EE	1,777					7		456	5,408	7	0				7,655
EL	76,885					32		58,604	273,746	143,865	8,691				561,823
ES	253,485					295		171,261	878,506	367,371	16,879				1,687,797
FI	2,694					18		97	43,305	2,340	65				48,519
FR	162,799					304		228,743	701,118	73,146	31,294				1,197,404
HR	23,996					54		22,594	179,619	8,712	2,111				237,086
HU	14,166					35		4,262	38,696	-	2				57,162
IE	4,413					8		21,807	11,068	6,475	2,182				45,952
IT	423,922					366		117,678	1,433,935	122,597	67,948				2,166,446
LT	5,112					45		1,010	7,795	4	1				13,968
LU	1,167					8		494	3,294	-	-				4,963
LV	3,386					16		1,472	10,896	-	1				15,771
MT	223					4		-	3	87	2				319
NL	1,148					27		786	656	50	-				2,666
PL	39,492					85		7,821	74,667	323	33				122,421
PT	41,548					60		2,476	107,043	26,021	2,245				179,393
RO	74,933					42		86,824	434,439	7,141	300				603,680
SE	7,547					109		7,622	185,066	44,047	5,058				249,449
SI	30,311					23		13,045	234,019	9,950	850				288,197
SK	15,542					12		7,843	97,875	1,480	271				123,024
EU	1,336,974					1,968	-	997,819	5,625,405	856,382	161,429	-	-	-	8,979,978

[illegible]

[illegible]

Ecosystem service: Soil Retention (on-site)							
Climatic characteristics, soil characteristics and terrain (slope) characteristics are the main drivers of soil erosion, whereas higher vegetation cover and sustainable land management practices limit soil loss due to erosion *							
* La Notte, A., Vallecillo Rodriguez, S., Garcia Bendito, E., Grammatikopoulou, I., Czucz, B., Ferrini, S., Grizzetti, B., Rega, C., Herrando, S., Villero, D., Zurbaran Nucci, M. and Maes, J., Ecosystem Services Accounting – Part III - Pilot accounts for habitat and species maintenance, on-site soil retention and water purification, EUR 30856 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-42051-4, doi:10.2760/636621, JRC126566							
https://publications.jrc.ec.europa.eu/repository/handle/JRC126566							
Land cover	Use of data	Identification of ecosystems (extent) and parameters assignment					
	Component	Demand, unmet demand, potential, use (biophysical), use (monetary)					
	Original input	Corine Land Cover Accounting Layers					
	Link	https://www.eea.europa.eu/data-and-maps/data/corine-land-cover-accounting-layers					
	Derivation	Source	Coordinate Reference	Spatial resolution	Temporal coverage	Spatial coverage	Format
	Derived	EEA - Copernicus	EPSG:3035	100m	2000-2018	Europe	GEOTIF
	Alternative EO	ESA Worldcover					
	Link	https://esa-worldcover.org/en					
	Derivation	Source	Coordinate Reference	Spatial resolution	Temporal coverage	Spatial coverage	Format
	Derived from Sentinel 1 & 2	ESA	EPSG:4326	10m	2020-2021	Global	WMS service
Notes/Methodology	Used to determine the extent of the ecosystems						
Crop type	Use of data	Input for C-Factor (dynamic over time)					
	Component	Demand, unmet demand, potential, use (biophysical)					
	Original input	[apro_cpsh1], Farm structure survey data					
	Link	#N/A					
	Derivation	Source	Coordinate Reference	Spatial resolution	Temporal coverage	Spatial coverage	Format
	#N/A	EUROSTAT	#N/A	#N/A	#N/A	#N/A	Tabular
	Alternative EO	EUCROPMAP					
	Link	https://data.jrc.ec.europa.eu/dataset/15f86c84-eae1-4723-8e00-c1b35c8f56b9					
	Derivation	Source	Coordinate Reference	Spatial resolution	Temporal coverage	Spatial coverage	Format
	Derived from LUCAS and Sentinel-1	JRC	EPSG:3035	10m	2018	European Union	GEOTIF
Alternative EO	High-Resolution Layer (HRL) Vegetated Land Cover Characteristics (VLCC)						
Link	https://remotesensing.vito.be/clms-consortium-starts-hr-layer-vegetated-land-cover-characteristics-project						
Derivation	Source	Coordinate Reference	Spatial resolution	Temporal coverage	Spatial coverage	Format	
Derived from Sentinel 1 & 2	Copernicus (VITO)	TBD	10m	2017-2021 (2022 & 2023 planned)	European Union	TBD	
Notes/Methodology	The proposed alternative provide spatially explicit data on crop types that can serve for the purpose of the calculation of the C-Factor instead of tabular data						



- INCA uses the **MAES** typology for ecosystems;
- **CORINE Land Cover Accounting Layers** are the main input, then a crosswalk is done between classes;
- Currently, CLC is released every 6 years while **accounting periods are more subjective and foreseen to be more frequent**;
- **Using the latest available CLC Accounting Layer is the best option to ensure consistency across the time series, that goes back to 2000**;
- For the next accounting period (2021), there is no release of a new CLC Accounting layer, making 2018 release the most viable choice;
- Transitioning to **another land cover map** would imply **loss of consistency in the time series**;
- **Recent land cover maps** have higher resolution but **lack land use information and backwards consistent time-series**.

Current status

- **Models** have already **been developed** for ES at EU level;
- **Most of them** **rely heavily** on **Earth Observation data**;
- Efforts to operationalize and streamline have been made, through the **development of a QGIS plugin (INCA Tool)**;
- **Data remains the main bottleneck** for ensuring the calculation of future EA:
 - **Continuity is not always guaranteed**;
 - **Spatial and/or temporal coverage** is not sufficient;
 - **Resolution** poses limitations for some ES – too coarse;
 - **EO products release does not always align with accounting periods.**

On-going efforts

- In-depth analysis of EO inputs for EA is undergoing;
- **Compilation of a database with required inputs for ES is being developed** to highlight existing gaps that must be addressed to ensure future EA and the adoption of the INCA Tool.

Produced by

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INCA Platform:

<https://ecosystem-accounts.jrc.ec.europa.eu/>

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Thank you, questions?