Using a continental-scale geo-spatial accounting system to support EU decision-making

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**European Topic Centre
Data integration and digitalisation**

Key developments at EU level

- **EU Green Deal:** tackle climate and biodiversity crises; addresses many components of economy and society (e.g. 'Farm-to-fork strategy')

- **Implementation of LULUCF Regulation** to decrease greenhouse gas emissions and increase removals in the LULUCF sector

- **Eurostat proposal for an ecosystem accounting module** to be included in EU environmental accounts regulation (yet to be adopted)

- This obliges statistical offices in EU Member States to develop:
  - Ecosystem extent accounts
  - Ecosystem condition accounts
  - Ecosystem service accounts

We need to translate geospatial data to meaningful, transparent messages

- Efficient design of nature restoration plans: understand where impacts occur, address the magnitude of impacts and address these synergically with drivers of change and resulting pressures

- Good news: there is an ever-increasing set of EO data, e.g. CLMS and Sentinels, and information on the extent and condition of ecosystems.

- But:

  1. Geospatial datasets need to be translated into meaningful and transparent messages to assess impacts.

  2. Information is scattered and hence it is increasingly challenging to find and access the data – both EO data and derived indicators.

- There is a need for an operational analytical environment for experts.

We need to translate geospatial data to meaningful, transparent messages: assessment framework
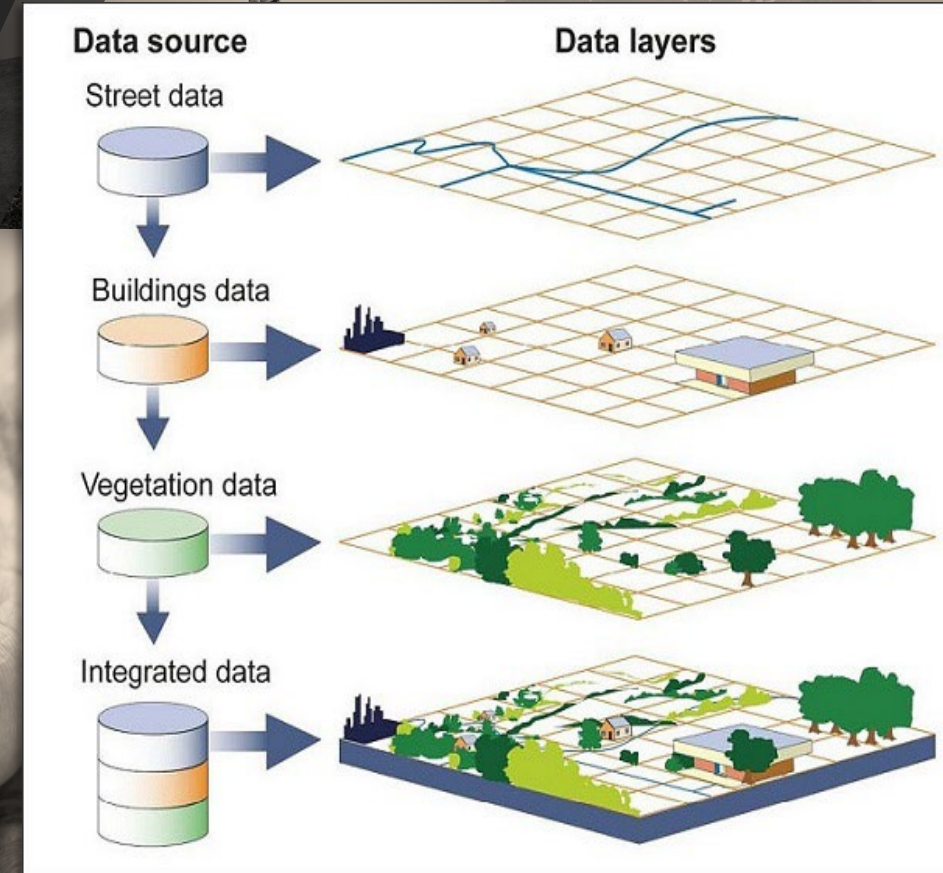
We need to translate geospatial data to meaningful, transparent messages

FAIR-principles :

- **Findable** (results are easy to be found)

- **Accessible** (Results are fast, effective, efficient, "on-demand")

- **Interoperable** (Quality assured and controlled)

- **Reusable** (transparent processes, known sources, known methods

Meaningful and transparent messages to support policy intervention

Data source — Data layers
Street data
Buildings data
Vegetation data
Integrated data

Source: GAO.

Translating geospatial data to meaningful, transparent messages

Finding the meaningful data

"According to research from data protection specialist Veritas Technologies, **employees are losing two hours a day searching for data,** and data management challenges are costing businesses as much as $2 million a year."
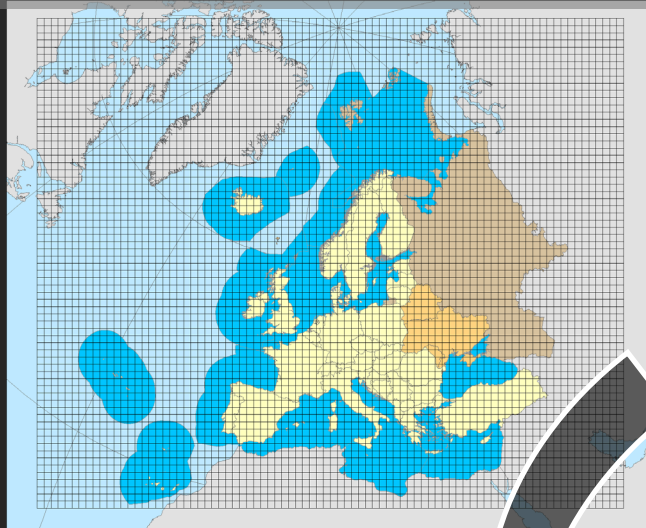
https://betanews.com/2019/03/12/two-hours-wasted-searching-data/

Translating geospatial data to meaningful, transparent messages

Storing the meaningful data: spatial data infrastructure

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EEAs accounting grid for data harmonization

EEA's Spatial Data Infrastructure and metadata catalogue with standardised file system storage

Harmonized QA/QC criteria

https://sdi.eea.europa.eu/

Translating geospatial data to meaningful, transparent messages

Understanding if the data is meaningful: web map platform

Translating geospatial data to meaningful, transparent messages

Understanding if the data is meaningful: time series
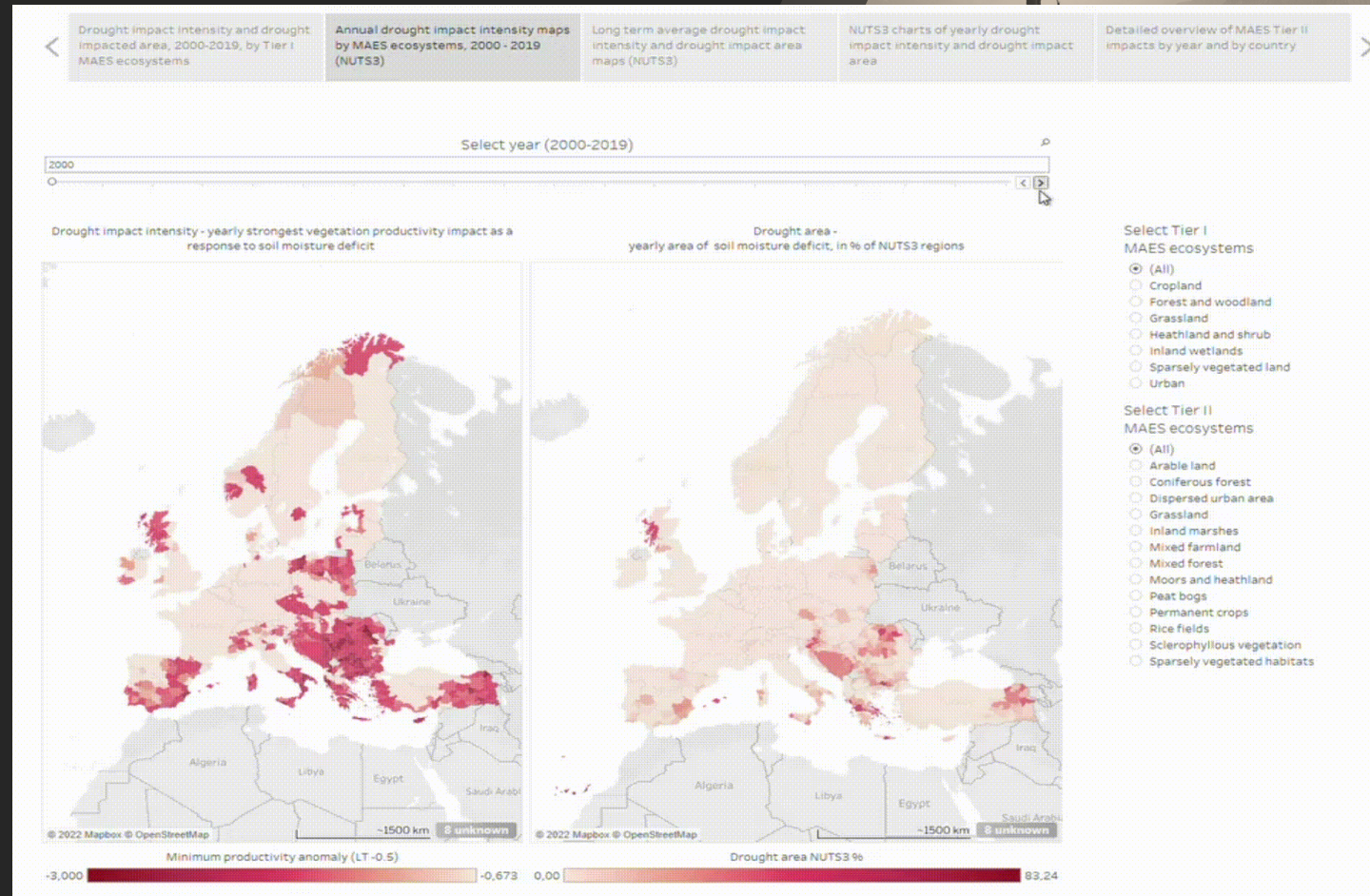
Translating geospatial data to meaningful, transparent messages

Converting meaningful data to accounting ready datasets

Spatial Data Infrastructure
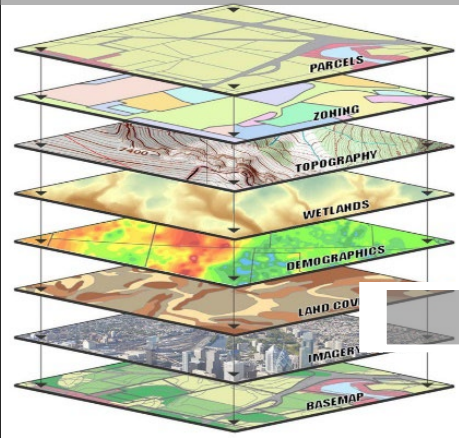
Integrated Data Platform: analysis ready format
Azure data bricks
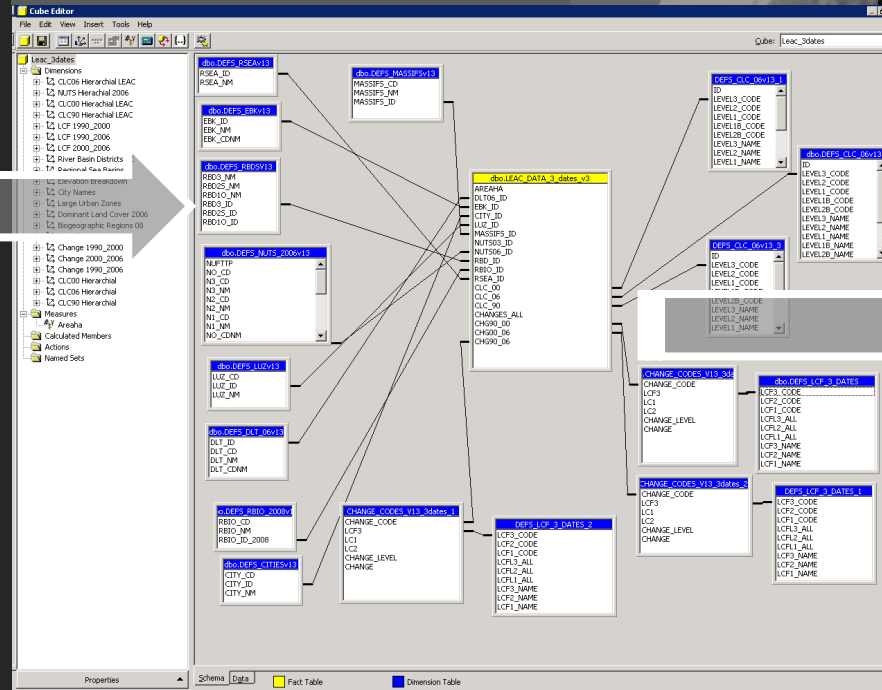
Data cubes: analytical databases with various and numerous dimensions as basis for assessment platform
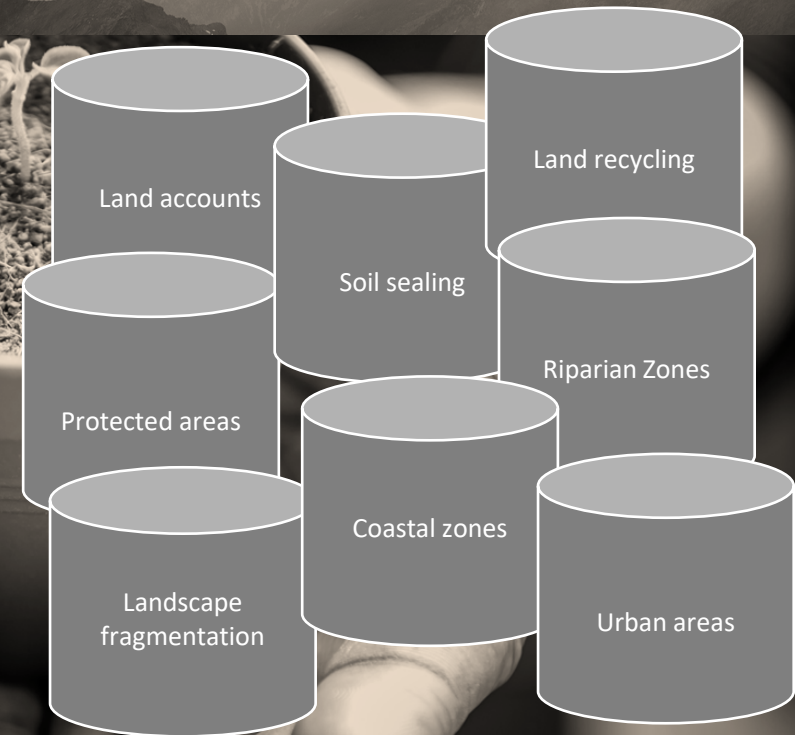
Translating geospatial data to meaningful, transparent messages

Example: The land accounting system

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CLC 2000
CLC 2006
CLC 2012
CLC 2018

Addressing "from" "to" chnages results in a matrix of changes

(44 x 43 possibilities = 1892 possible changes)
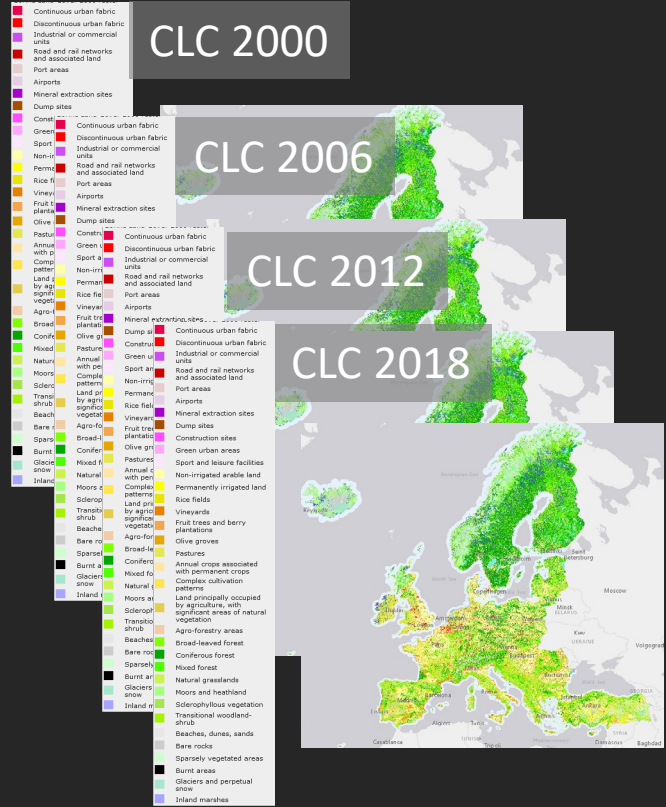
Land Cover Flows

• 9 Level 1 Land Cover Flows

• 50 Level 2 Land Cover Flows

Translating geospatial data to meaningful, transparent messages

Land accounts in maps, for example:

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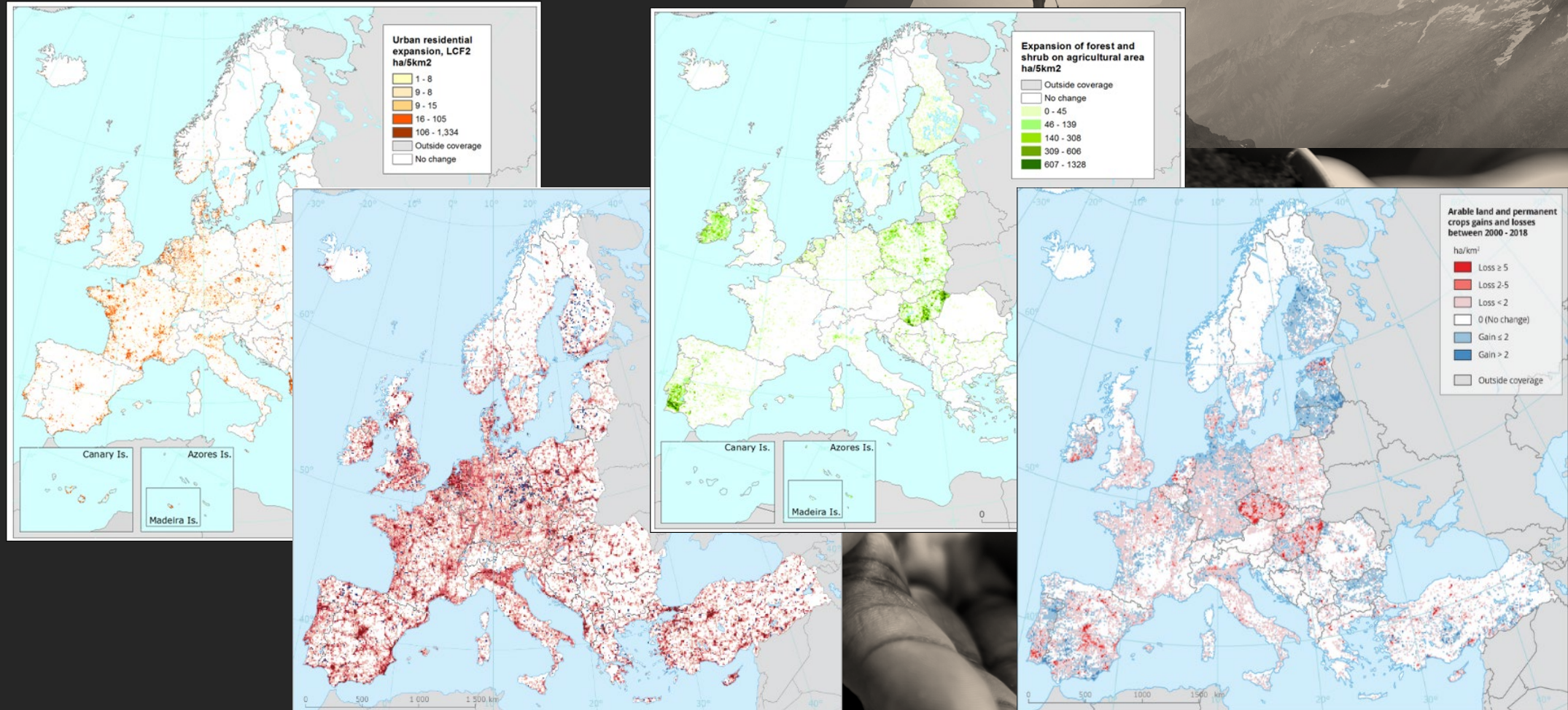
Translating geospatial data to meaningful, transparent messages

Land accounts in charts, for example:
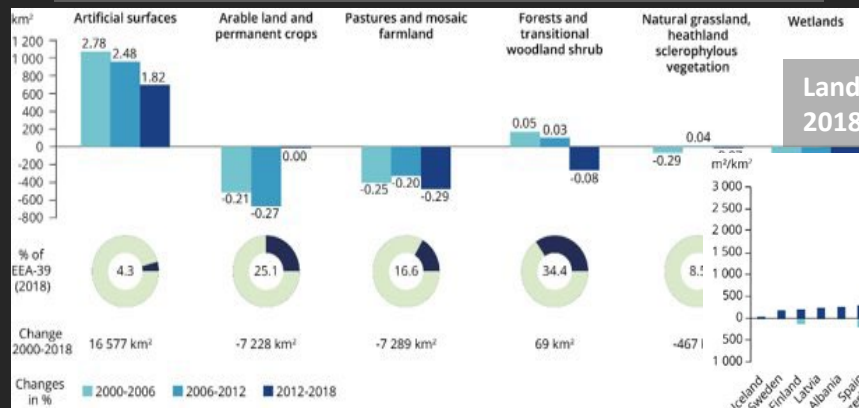
Translating geospatial data to meaningful, transparent Messages

New report on land take accounts in Functional Urban Areas (FUAs)
https://www.eea.europa.eu/highlights/urban-sprawl-continues-at-the

Drivers of land take: population growth, the need for transport infrastructure, cultural preferences and economic welfare.

Land use pressures: expansion of industrial and commercial units, sprawl of residential areas and the expansion of construction sites.
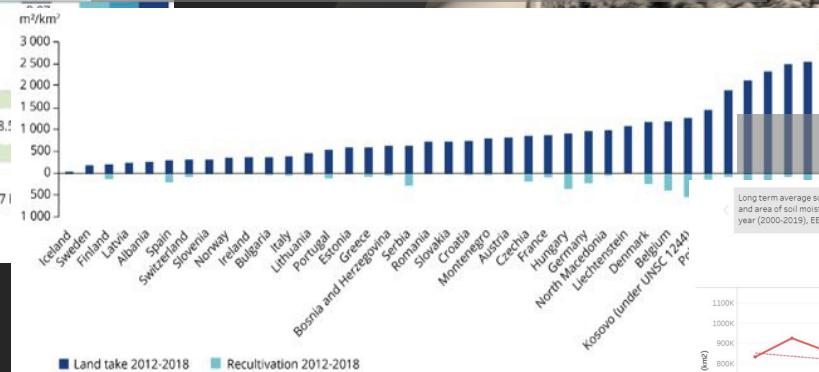
State between 2012 and 2018:
- land take increased by 3 581 km^2 and soil sealing increased by 1 467 km², **mostly at the expense of croplands and pastures.**
- Almost 80 % of land take took place in commuting zones
- Citizens in commuting zones use far more artificial areas than those in cities

Impacts:
- **46 % of the FUAs strongly fragmented,** forest habitats being most affected, followed by croplands and grasslands.
- **The average habitat size within FUAs is 0.25 km^2,** while outside FUAs habitats are 1.4 km^2 on average.
- The average habitat size in a protected area is approximately 2.5 km^2
- Most land take and sealing impacted lands with high productivity potential.
- Soil sealing caused a **loss of carbon sequestration potential estimated at 4 million tonnes of carbon** of the FUAs.
- Sealing also caused an estimated **potential loss of water-holding capacity of 668 million m³.**

- **-> Policy response**

Land accounts: https://www.eea.europa.eu/data-and-maps/dashboards/land-cover-and-change-statistics

Ecosystem accounts: https://www.eea.europa.eu/data-and-maps/data/data-viewers/ecosystem-extent-accounts
Land take: https://www.eea.europa.eu/data-and-maps/dashboards/land-take-statistics
Imperviousness: https://www.eea.europa.eu/data-and-maps/dashboards/imperviousness-in-europe
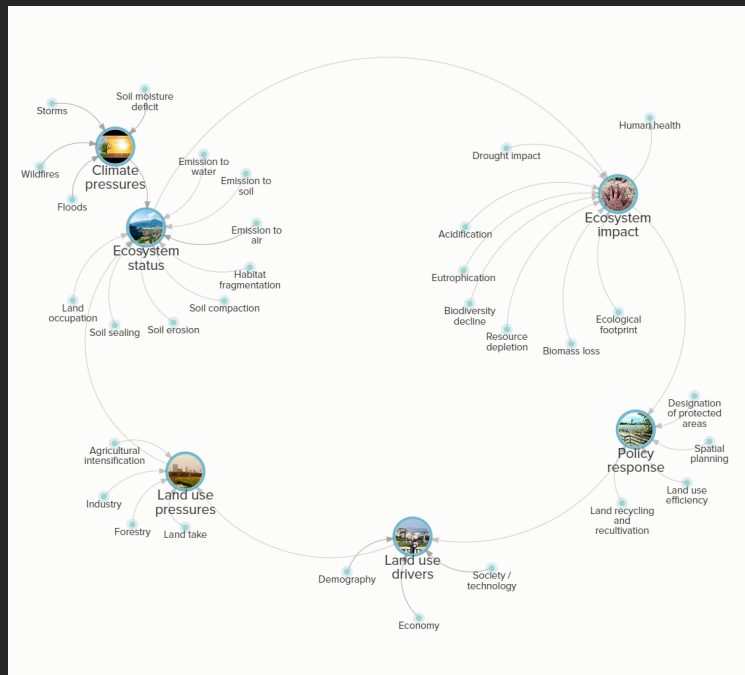
Soil sealing and ecosystem impacts: https://www.eea.europa.eu/data-and-maps/dashboards/soil-sealing-and-ecosystem-impacts

Land recycling: https://www.eea.europa.eu/data-and-maps/dashboards/land-recycling

Landscape fragmentation: https://www.eea.europa.eu/data-and-maps/data/data-viewers/landscape-fragmentation-in-europe

Protected areas (NATURA2000): https://www.eea.europa.eu/data-and-maps/dashboards/natura-2000-data-viewer

Floodplains: https://www.eea.europa.eu/data-and-maps/data/data-viewers/floodplain-areas

Soil moisture: https://www.eea.europa.eu/data-and-maps/data/data-viewers/soil-moisture

Drought impact: https://www.eea.europa.eu/data-and-maps/data/data-viewers/drought-impact-on-ecosystems-in

Drought productivity and land use: https://www.eea.europa.eu/data-and-maps/dashboards/vegetation-productivity-and-land-use

Urban Green Infrastructure: https://www.eea.europa.eu/data-and-maps/dashboards/urban-green-infrastructure-2018

Urban SDG 11.3.1 Land consumption per capita: https://www.eea.europa.eu/data-and-maps/dashboards/land-use-efficiency-in-functional

Thank you for your attention

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Please see also:

EEA briefing on Land and ecosystems accounts:
https://www.eea.europa.eu/themes/landuse/land-accounting

Technical report on land and ecosystem account method:
https://www.eionet.europa.eu/etcs/etc-di/products/etc-uls-report-02-2020-land-and-ecosystem-accounts-for-europe-towards-geospatial-environmental-accounting

EEA report on land take and its impacts:
https://www.eea.europa.eu/highlights/urban-sprawl-continues-at-the