Understanding the links between SOiL pollution and CancEr

(SOLACE)

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Exploratory Research Proposal

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Cancer burden in the EU – a societal challenge

human burden

1 in 2 men and 1 in 3 women estimated to develop cancer during their lifetime; 1 in 4 men and 1 in 6 women expected to die from the disease

ECIS (2020)

1/3 survivors experience lasting effects of treatment including pain, poor health and limitations to perform daily activities

Ekwueme et al. (2014) MMWR Morb Mortal Wkly Rep.

financial burden

Health annual expenditure on cancer care were €85 billion

Total productivity loss € 58 billion (€41 billion from premature mortality and €18 billion from morbidity)

Hofmarcher et al. (2020) European Journal of Cancer

Knowledge Gateway: https://ec.europa.eu/jrc/en/health-knowledge-gateway/societal-impacts/costs

Understanding environmental drivers of cancer

Winker @ Wikimedia Commons

Brian Robert Marshall @ Wikimedia Commons

- Contaminated air may make you cough
- Contaminated water may make you vomit
- Contaminated soils may give you a tumor in 25 years!
- SDG 3.9 reduce impact of soil pollution on human health

European Commission

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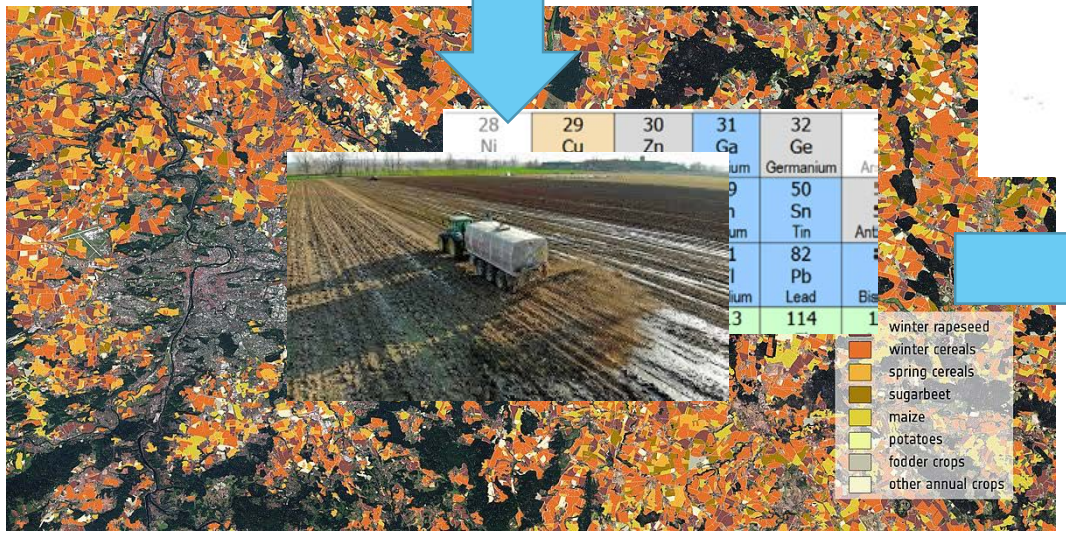
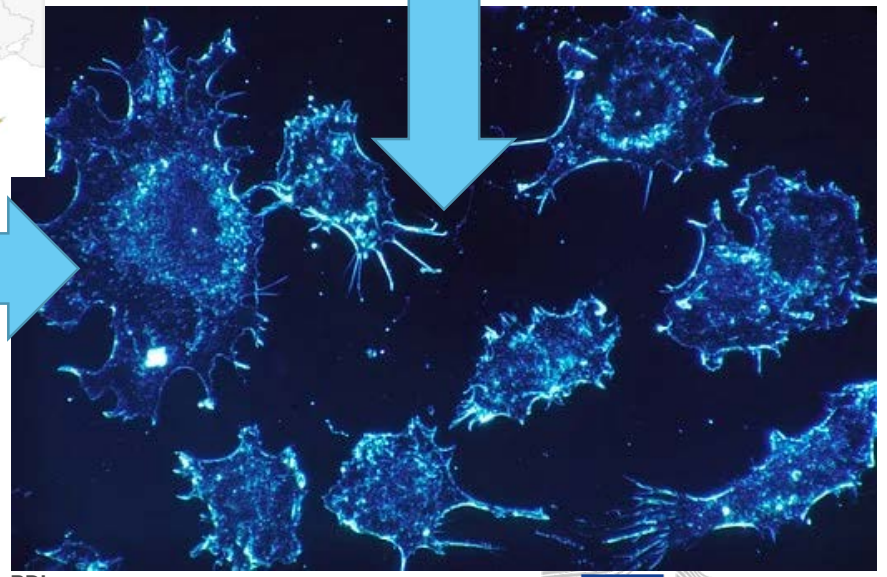


Pascvii PDI @ PIXBAY



PDI

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The EC's European Cancer Information System (ECIS)

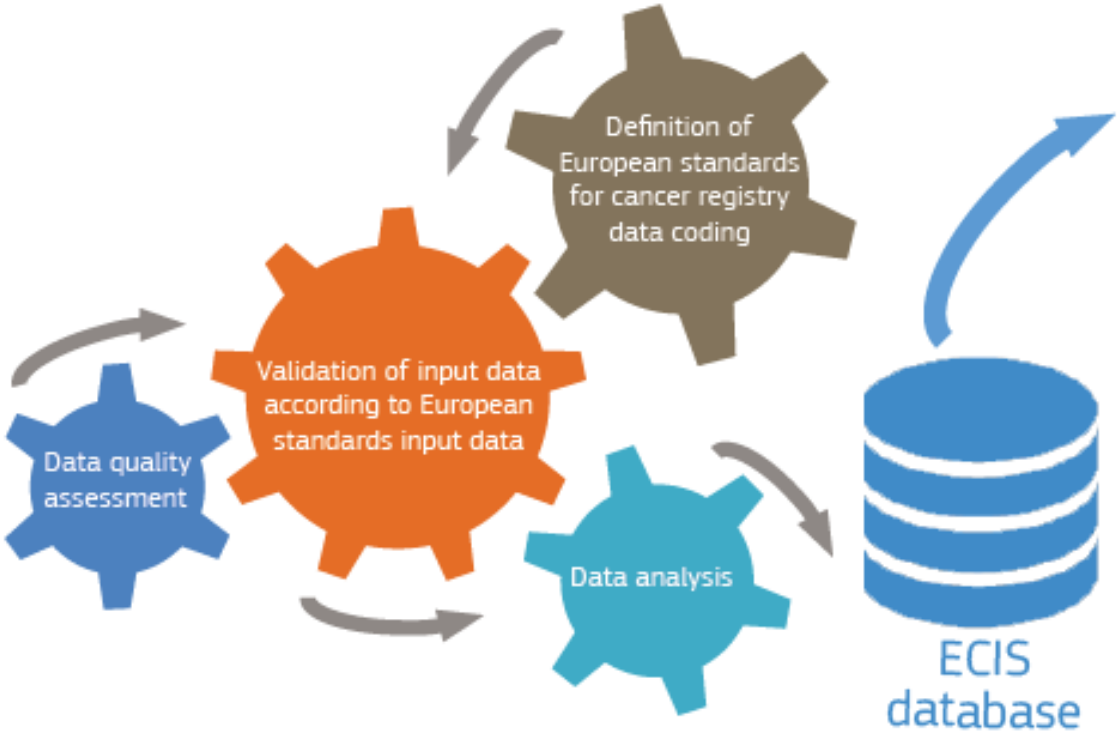
EC's Joint Research Centre https://ecis.jrc.ec.europa.eu/

INDICATORS BY

- Cancer type
- Geographical area
- Sex
- Age
- Year

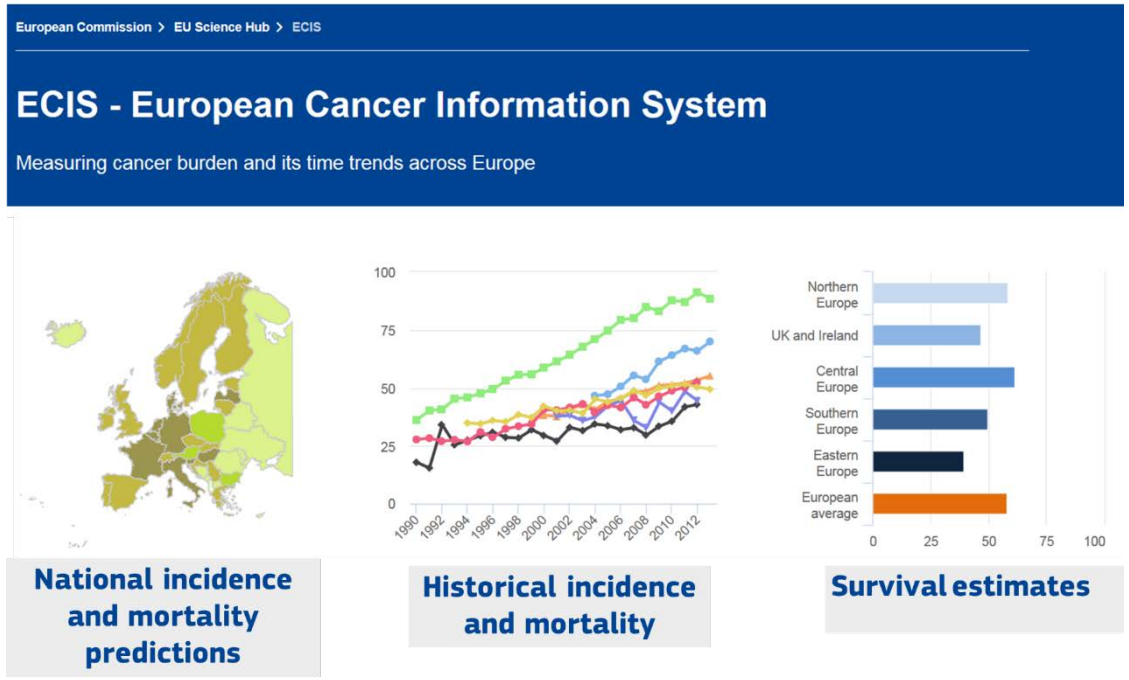
Data validation and analysis

Cancer data



34,500,000
cancer cases

Output statistics



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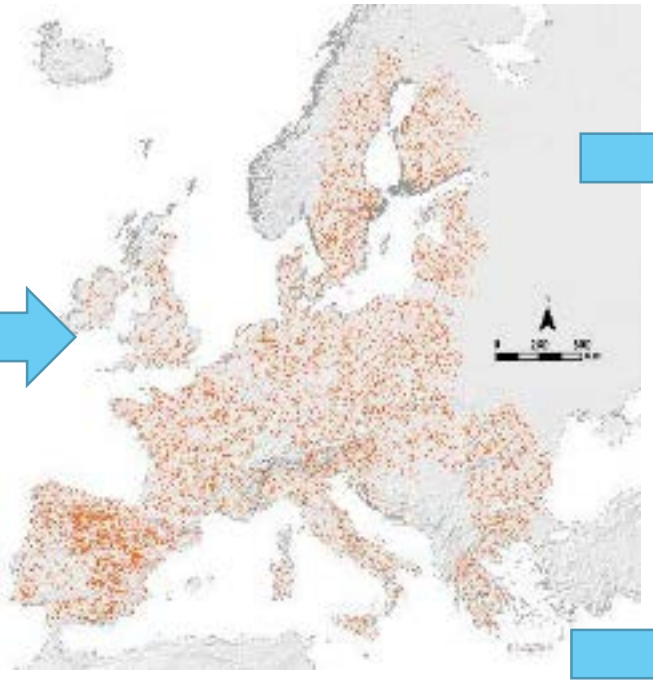
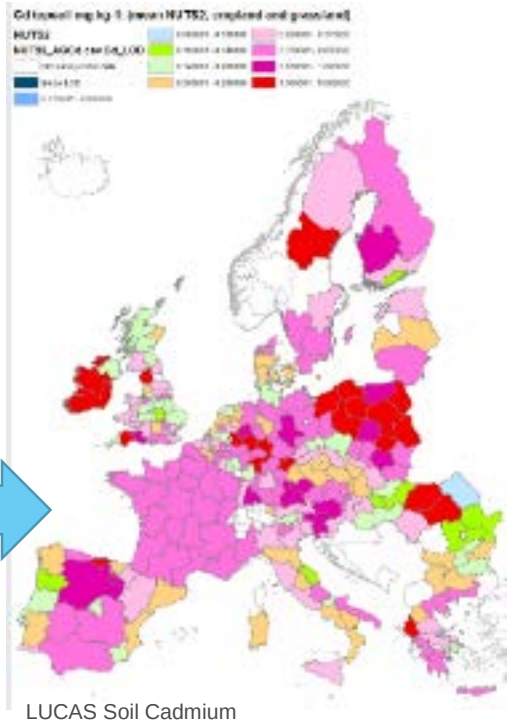
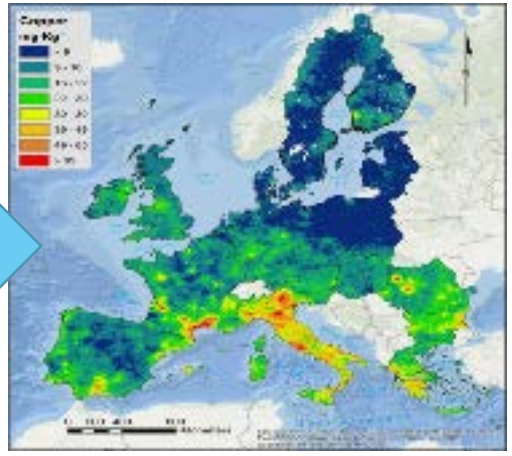
LUCAS Soil: Measuring soil pollution





LUCAS Soil Cadmium



LUCAS Soil Copper

JRC Coordinates LUCAS SOIL

Survey in 2009, 2015, 2018 and 2022

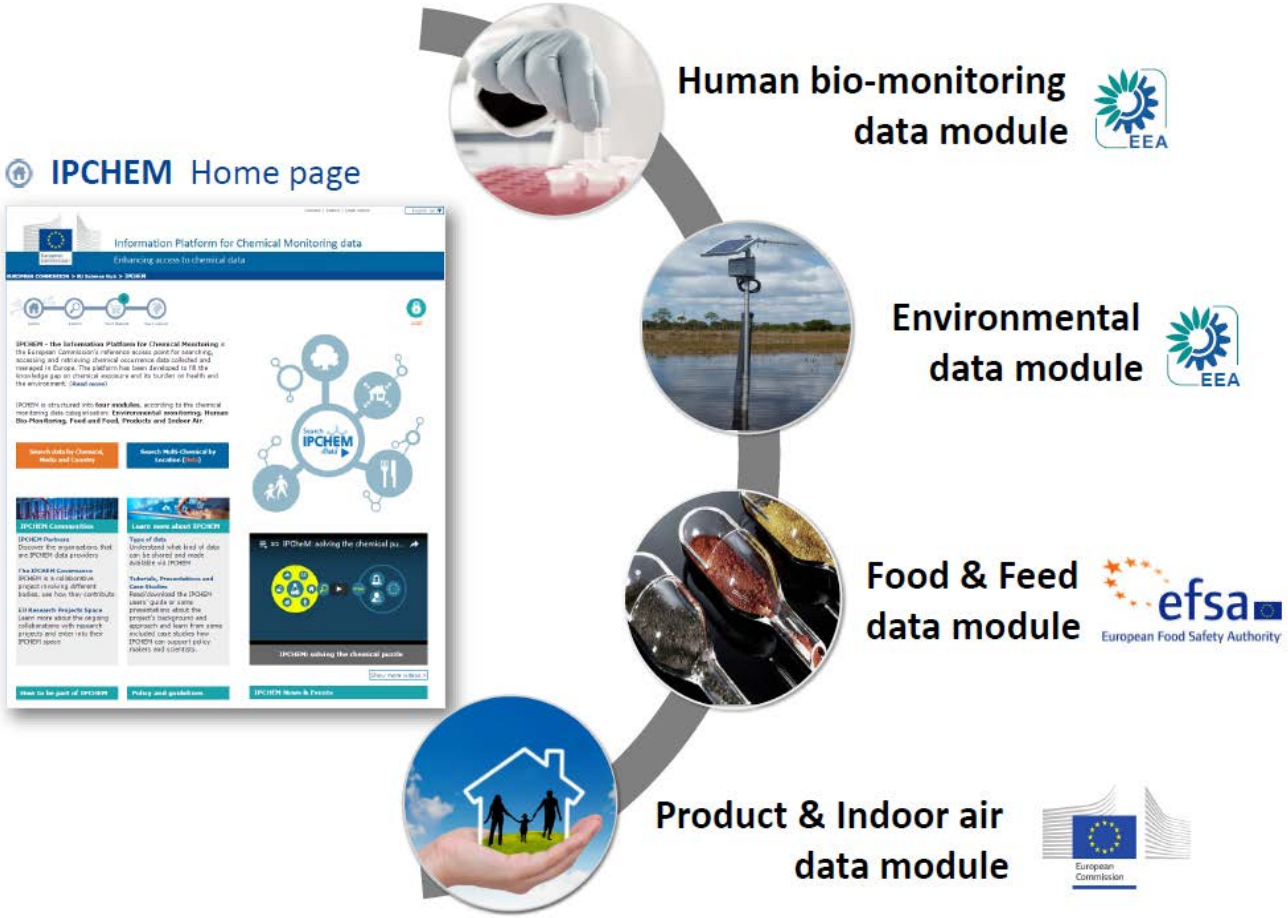
22,000 sampling locations > 42,000

Only harmonized soil data collection programme for the EU

Adaptable to measure range of pollutants (metals, pesticides, endocrine disrupters, plastic, etc.)

Support from across DGs (ENV, SANTE, AGRI, CLIMA, ESTAT)

IPCHEM
Information Platform for Chemical Monitoring



- **Single access point** for **searching, accessing and retrieving chemical occurrence data** collected and managed in Europe and beyond
- The platform has been developed to **fill the knowledge gap on chemical exposure** and its **burden on health and the environment**

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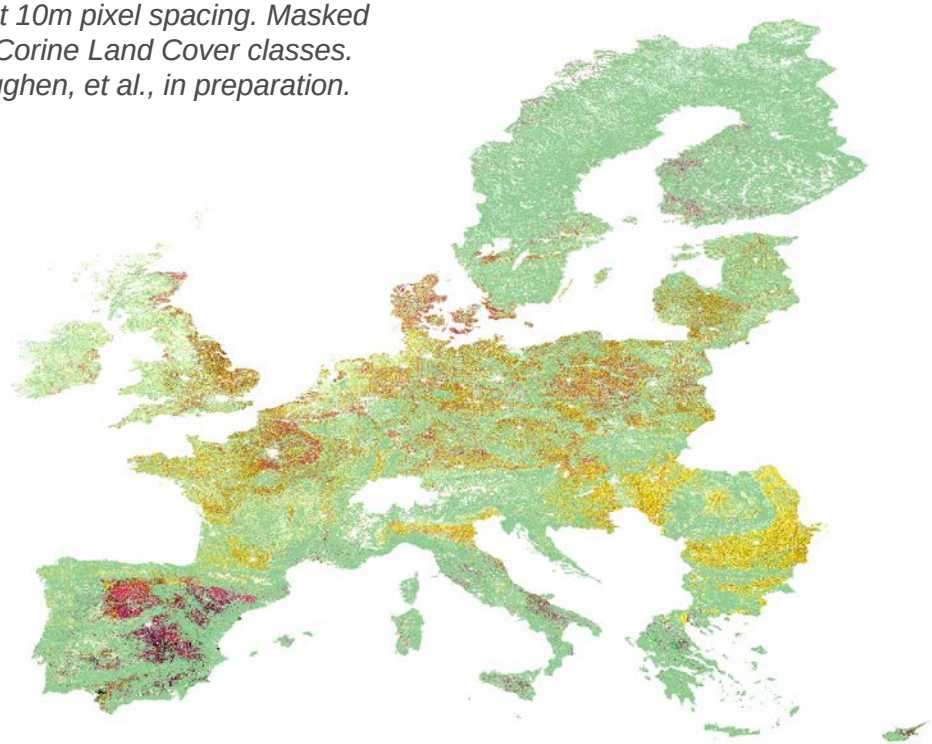
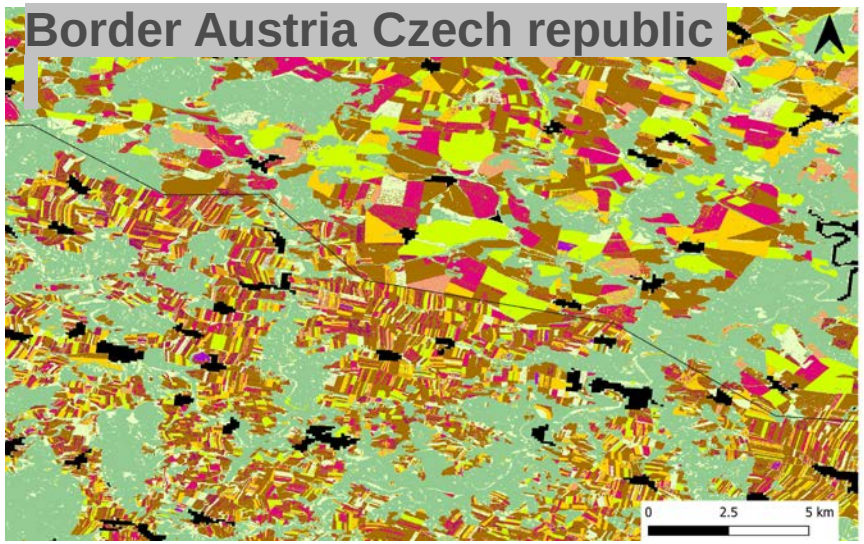
How do we know where crops are grown?

- Mapping all crops on all parcels in the EU is now possible!
- Copernicus Sentinel 1 observations and LUCAS Copernicus in-situ data
- Link crops with crop specific agri-chemical use?

211 Common wheat
212 Durum wheat
213 Barley
214 Rye
215 Oats
216 Maize
217 Rice
218 Triticale
219 Other cereals
221 Potatoes
222 Sugar beet
223 Other root crops
230 Other non permanent industrial crops
231 Sunflower
232 Rape and turnip rape
233 Soya
240 Dry pulses
250 Fodder crops (cereals and leguminous)
290 Bare arable land
300 Woodland and Shrubland (incl. permanent crops
500 Grasslands

EU 2018 crop map at 10m pixel spacing. Masked with non-vegetation Corine Land Cover classes. D'Andrimont, Verhegghen, et al., in preparation.





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Novel aspects

A real societal challenge in relation to both cancer and soil pollution.

Mirror the aspirations of the Green Deal (Zero Pollution, Farm2Fork)

Shows JRC is reactive to policy priorities with high public and scientific interest.

Links proposed Horizon Europe Missions on Cancer and Soil Health and Food.

The ER activity will provide a real focus for meaningful collaboration between two Units of Directorate D and two Units from Directorate F.

Integrate traditionally separate knowledge streams.

A real example of breaking silos.

If successful, a step to the prevention of cancer.

Image sources

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