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Statistical Register of Places: opportunities for climate change and disaster risk related indicators

Angela Ferruzza,
D. Abbatini, T. Clary, R. Chiocchini, D. Fardelli, L.Franconi, F. Lipizzi, S. Mugnoli, R. Radini, E. Orsini, P. Ticca
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From global to local and from local to global:
climate change, hazardous events and disasters, sustainability

Which goals and which statistical measures ?

UNECE Guidelines for **Climate Change (CC)** *2020 UNECE CC* **Core indicators (44**), 2022 **UN FDES Indicators (130)**

UNECE Guidelines related to (2019) **Measuring Hazardous Events and Disasters (MHED)** *and* **Core indicators (55)** *2023*

UN-IAEG **SDGs Indicators: 231 indicators**

The proposal revolution of all these frameworks: the economic, social, environmental and institutional goals have to be developed considering an **integrated approach from global to local to leave no one behind**

Statistical measures for a common language and is crucial to consider

Common geographies for a common language and for integration among domains

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From global to local and from local to global:
climate change, hazardous events and disasters, sustainability

The effectiveness of indicators and of data depends not only on the statistical design of the data, but also on an adequate **geographical disaggregation** that can demonstrate geographical variations of phenomena

This involves the creation of a **spatial data infrastructure** enabling standardized location references **for mapping spatial location to statistical data units**. It is recommended that the statistical data are **referenced to the finest geographical scale possible, down to a geographic coordinate.**

The assignment of a unique identifier to each location area allows linking with other statistical and geospatial data associated with the same geographic space.

The **geocoding** of statistical data considerably expands the analytical possibilities, including integrating them into indicators and other data, but also **analyzing the data from a geographical point of view**.

The provision of these **common geographies** allow the generation of statistical data in a consistent manner, through **cartographic grids or units with administrative or statistical boundaries**. These allow statistical data to be aggregated/disaggregated at different levels for the purpose of their integration.

Common geographies for a common language and for integration among domains

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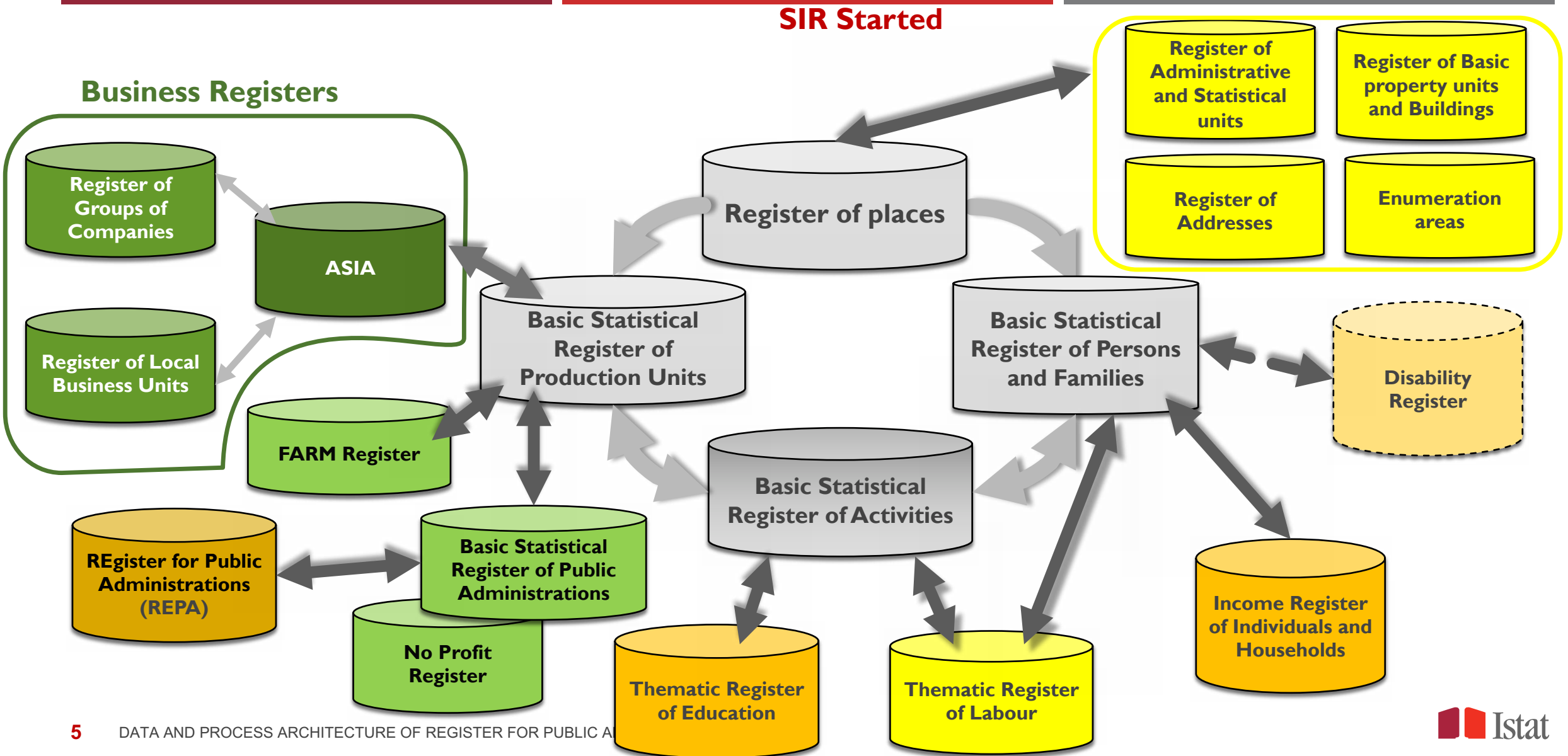# Administrative and statistical data, a big challenge: Statistical Register of Places (RSBL)

An essential step

Istat is changing its production processes and aiming to an **Integrated System of Statistical Registers**: at the **very heart** of it lies the **Statistical Register of Places (RSBL).**

The geographical statistical information of **Statistical Register of Places** has an **increasing potential** to consider statistical measures related to climate change and sustainability.

The use of administrative data and of Statistical Registers is essential but it is a big challenge for methodological and institutional reasons related also to confidentiality issues

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Italian Integrated System of Statistical Registers (ISSR)

1996	2002/2006	2011	2012/2015	2016	2017/2018	2018/2019	2019/2020	2021/2023

SIR Started

Business Registers

Register of Groups of Companies

ASIA

Register of Local Business Units

FARM Register

Register of places

Register of Administrative and Statistical units

Register of Basic property units and Buildings

Register of Addresses

Enumeration areas

Basic Statistical Register of Production Units

Basic Statistical Register of Persons and Families

Disability Register

Basic Statistical Register of Activities

REgister for Public Administrations (REPA)

Basic Statistical Register of Public Administrations

No Profit Register

Thematic Register of Education

Thematic Register of Labour

Income Register of Individuals and Households

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Administrative and statistical data, a big challenge: Statistical Register of Places (RSBL)

RSBL: a **complex system** with **several components**

For **each register component**, variables are being built detailing several characteristics of the entity under study and information on their **quality.**

The **challenge** is the production of spatial information able to respond to the heightened need of detail statistical data integrating the different component

The **goal** is **to have a detailed geography for the statistical units of all the other social and economic statistical register** and of some surveys to improve statistical analyses

The **construction process** is **complex** and faces several issues:

• the **very high number of objects** involved and

• the **integration** of components stemming from different sources independent from each other.

Statistical Register of Places (RSBL)

Enumeration areas and micro-areas

Administrative and statistical territorial units: Situas

Buildings

Addresses

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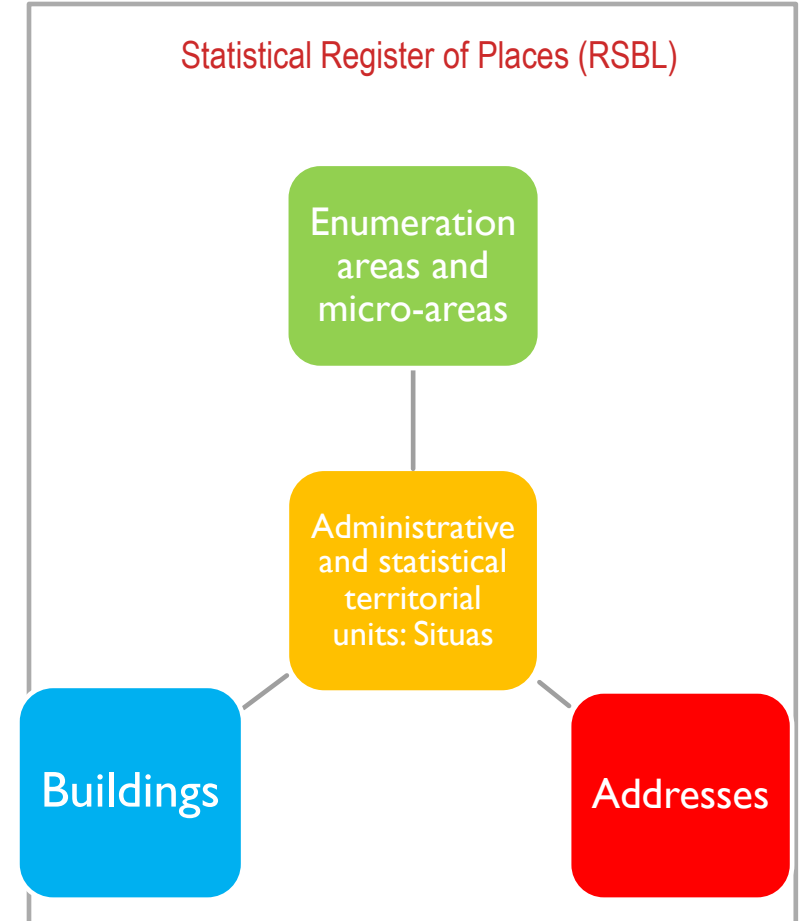
Administrative and statistical data, a big challenge for sustainability and climate change: Statistical Register of Places **(RSBL)**

Statistical Register of Places: Which components ?

Administrative territorial units and functional areas (7904 municipalities and LLMA, FUA, DEGURBA …)

Enumeration areas: many different archives of geographic data for **800000** georeferenced enumeration areas and 1,1 milion microzones (infrastructures, green areas, ….)

Addresses and geographic coordinates: many administrative archives of data for **30** millions CUI Unique Identification Code of addresses geographic coordination XY of CUI, Quality indicators.

Buildings and basic property units: administrative archives Real Estate Registry from Cadastral agency, geographic agencies and open sources. Buildings are georefered. In 2021 **29** millions Buildings of which **14.4** millions are residential

The **integration process** has seen **different methods** applied to different entities in order to reach the **highest quality** possible result.

Statistical Unit ➡️ *Addresses* ⬅️ *Buildings/dwellings*
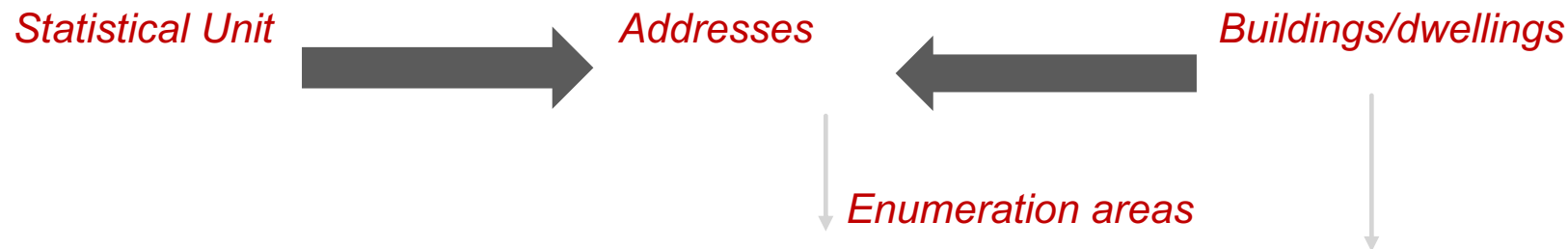
Enumeration areas

The first result can be seen with the production of a preliminary 1km population grid, dwelling data, enumeration areas

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Register of administrative and statistical territorial units with its dynamic portal to enquire structure and changes of territories

Istat | Istituto Nazionale di Statistica

SITUAS
Sistema Informativo Territoriale delle Unità Amministrative e Statistiche

Cerca report 🔍 | IT ⌄

Home | Unità territoriali | Variazioni delle unità territoriali | Ricostruzione dei codici statistici | Storia unità amministrativa | Ricerca codice Istat | Download | Glossario

Territories

Ancient geographies
Municipalities, Provinces, Circondari, Compartimenti (1861-1947)

Administrative geographies
Municipalities, Provinces, Metropolitan cities, Liberi consorzi, Regions (dal 1948)

Statistical geographies
Labour Market Areas and Industrial Districts; NUTS;Functional Urban Areas (FUA); Project Areas (SNAI, non-core areas)

Classifications

Policy areas (cohesion policy)

Geographic and territorial
Elevation zones, Ecoregions, Littoral municipalities, etc.

European (Tercet)
Degree of urbanisat., Coastal areas, Mountain, Ecoregion etc .

Functionalities

Free search by date for lists of territories/ classifications

Free search by period for variations, history of units, legislations

Visualisations of code changes by period

Geography comparisons at different dates

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RSBL Enumeration areas

It is a geo-referenced archive in which the territory of all 7,904 Italian municipalities is divided into enumeration areas (400.000 to 800.000) and micro-zones based on land cover (built-up, natural, infrastructure, water, etc.)

- Improved precision and detail of the drawing (significant increase in the number of vertices that make up the polygons of the sections)

- Consistency with land cover, evidenced through aerial photos

- Greater articulation of the 2011 sections of "scattered houses" (part of the residual territory with respect to inhabited localities)

- Delimitation of particular geographical objects (roads, infrastructures, rivers, agricultural and forest areas, etc.)

- In the past 2006 and 2016 dissemination …. provisional Enumeration Area's 2021 is going to published

- Integration validation and national mosaication is going to take place: first results in the next months

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RSBL Enumeration Area: an example of land classification

1	Area or building for residential use
5	Urban park
6	Port area
8	Military barracks
9	Hospital, care institute,
10	Rail and railway infrastructure
12	Productive activities
16	Sports facility
19	Temporary detention centres for foreigners
22	Woodland
24	Penal institutions
25	Hotel, campsites, ecc.
26	Agricultural area
27	Lighthouse
29	Communal house
31	Museum area
37	Community services: schools, telecommunications etc.
50	Potabilizers
55	Shopping centers

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Enumeration Area's 2021: an example of land classification

64 Olive trees

63 Fruit trees

26 Cropland

28 Sparsely vegetated areas

21 Quarries

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Monumental villa: A very big elegant building surronded by gardens of historical significance

Green Urban areas: parks in urban areas rich in meadows and trees
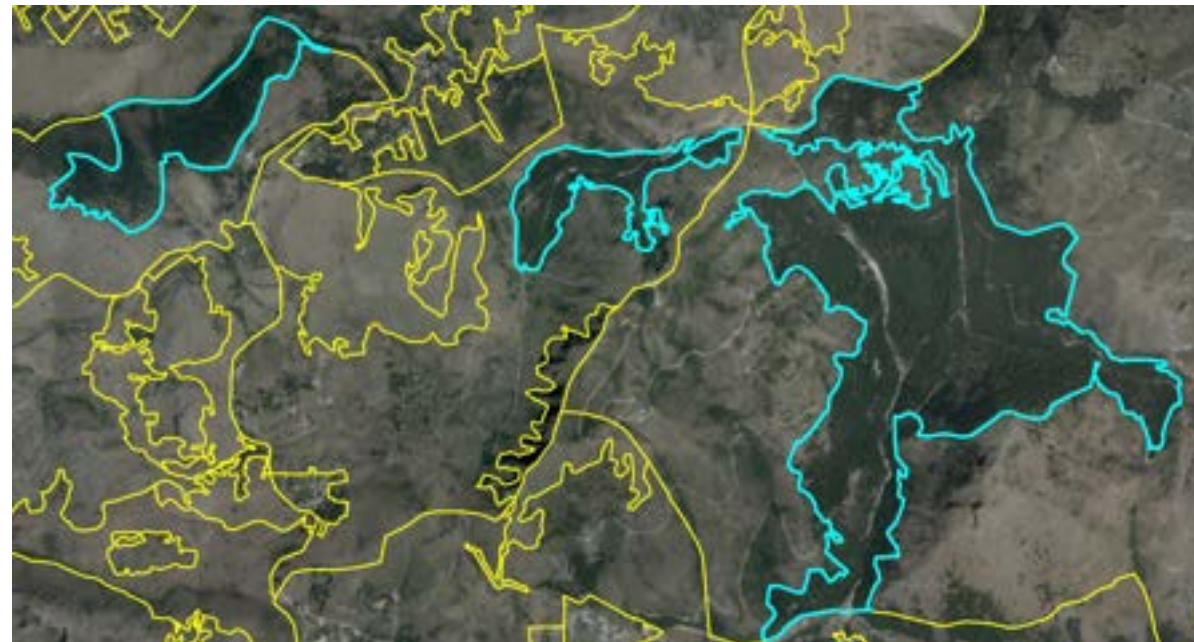
Woodland: FAO definition 'land with tree crown cover (or equivalent stocking level) of more than 10 percent and an area of more than 0,5 hectares (ha)

RSBL- Addresses

CUI: Unique identification code of address

[CUI]: **30 mln**
[CUI-EAs]: 27,8 mln (95%)
[CUI-XY]: 24,1 mln (80%)
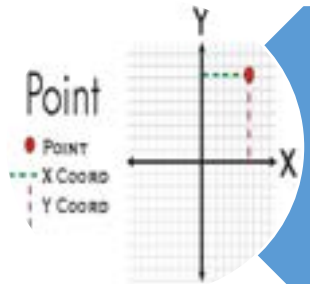
Geographic Coordinates

Anncsu: National Archive of Addresses of Urban Streets
LAC: Administrative Archive of resident population
AT: Internal Revenue Agency
Cens2011: Addresses used in Census Population 2011
RLP: Real Estate Registry

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Geography Coordinates and Enumeration Areas

Tipology of Geographic Coordinates

- ● Point Addresses
- ● Interpolated
- ● Approximated

☐ Census Block

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RSBL: Buildings and Basic property units Register

The main administrative source is the Cadastral Administrative Archive, which registers any Real Estate unit, therefore not only residential buildings. Other sources are considered: Regional Cartography, National Geoportal, Open Street Maps

Buildings have been georeferenced. The information of the geographical center of gravity is used to improve the quality of the georeferencing of the statistical units. The addresses of the buildings and of the dwellings are considered.

Dissemination of dwelling May 2023.

Geostatistical analyses, integrated new indicators and possible future uses for climate change and disaster risk statistics are on going ...also with Civil Protection and Ministry of Environment and Energy

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RSBL: Buildings and Basic property units Register *(data expressed in thowsands)*
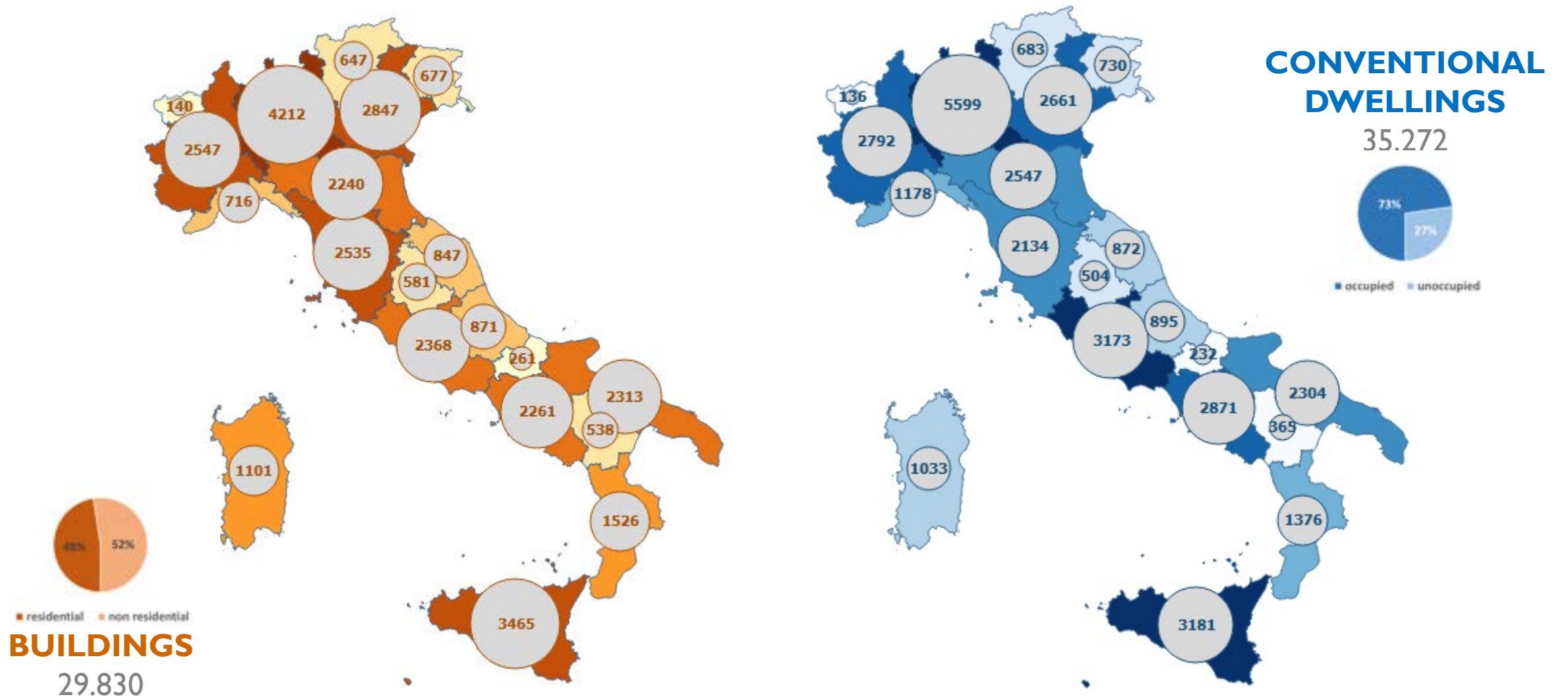
BUILDINGS

29.830

residential | non residential

CONVENTIONAL DWELLINGS

35.272

occupied | unoccupied

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From administrative data to statistical data,
a big challenge for RSBL integration and for Integrated Register System

Process: updates of administrative archives, processing to check the quality of data

Methodological approach to consider the **interlinkages and complex integration strategies** considering the confidentiality issues

Integration of **RSBI** population register (also census) with the **RSBL** Register of the Places to consider the population in. **Integration** of **Economic registers** with the RSBL in progress: experimental phase

Every kind of information with geographic coordinates could be integrated. The final integrated product will allow the possibility of geo-referencing information for flexible outputs.

Climate change and sustainability statistics can be improved considering anthropic pressure

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From administrative data to statistical data:
a big challenge for RSBL integration and for the Integrated System of Statistical Registers

CUI = Address identifier
UIU = Basic property unit identifier

CUI – UIU = Link stemming from the integration process in RSBL

Looking at hazardous events and disasters
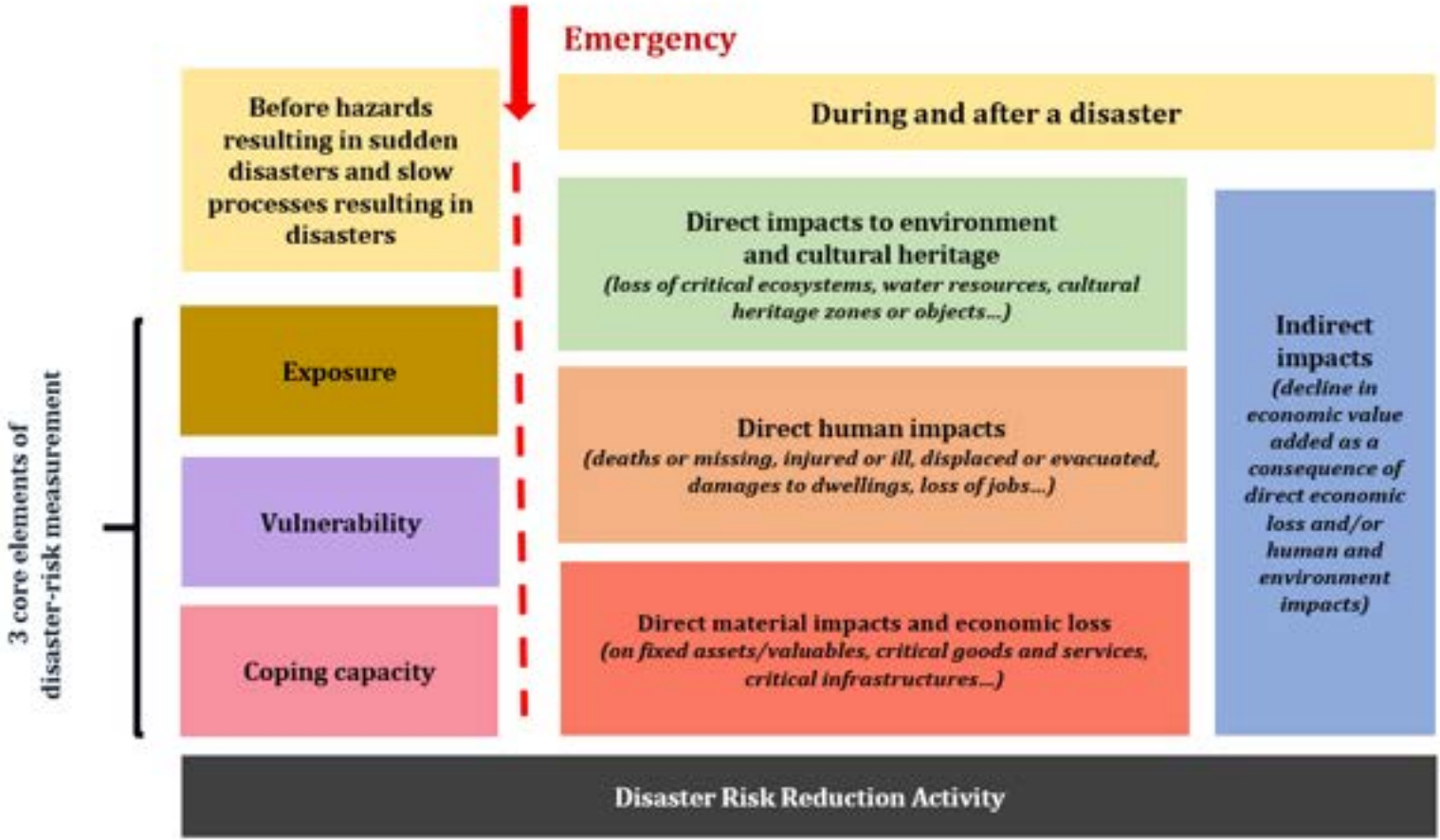
From administrative to statistical data, a big challenge for climate change, hazardous events and disasters, sustainability: Statistical Register of Places (RSBL)

The geographical statistical information of **Statistical Register of Places** has an **increasing potential** to consider statistical measures related to climate change, hazardous events and disasters, sustainability.

- Ex-ante analysis of areas presenting high risks of fires, flood, or earthquake, ….

- Ex-post analyses of areas hit by natural disasters, production of tool-set of ready statistical indicators

- Disaster Prevention: Building at less than a specified distance from rivers, lakes, sea …Buildings next to industries, Buildings in contaminated toxic areas

- Disaster Recovery: Building in areas hit by earthquakes, landslides, flouds, extreme weather conditions, caught on fires …

- Building involved in severe heatwave in large municipalities

- Green cover in urban areas using high resolution remote sensed images via the production of vegetation indices, and extraction of statistical information linked to the total vegetation cover in the major Italian urban centres; very useful to consider sustainability and climate change indicators

- Air pollution analysed considering very detailed territorial area and linked with exposed population

- Land consumption, Protected areas, Energy consumption in residential buildings …

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WebGIS for geo-referenced statistics

Census mapping cartography and indicators with hospitals overlaid

Population Grids: from local to global

Population grid statistics as an alternative to population statistics for administrative areas. Population grids are a powerful tool to describe our society and to study the interrelationships between human activities and the environment. They are particularly useful for analyizing phenomena, and their causes, which are independent of administrative boundaries, such as, fires, flooding, commuting and urban sprawl, air pollution …

GEOSTAT 1A – Representing Census data in a European population grid
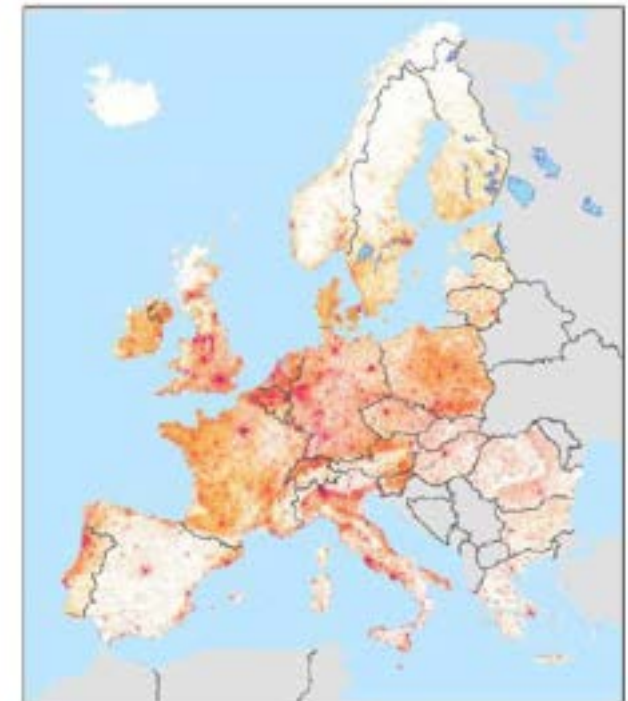
320.000 cells
400mila polygons in EAs2011
700mila polygons in EAs2021
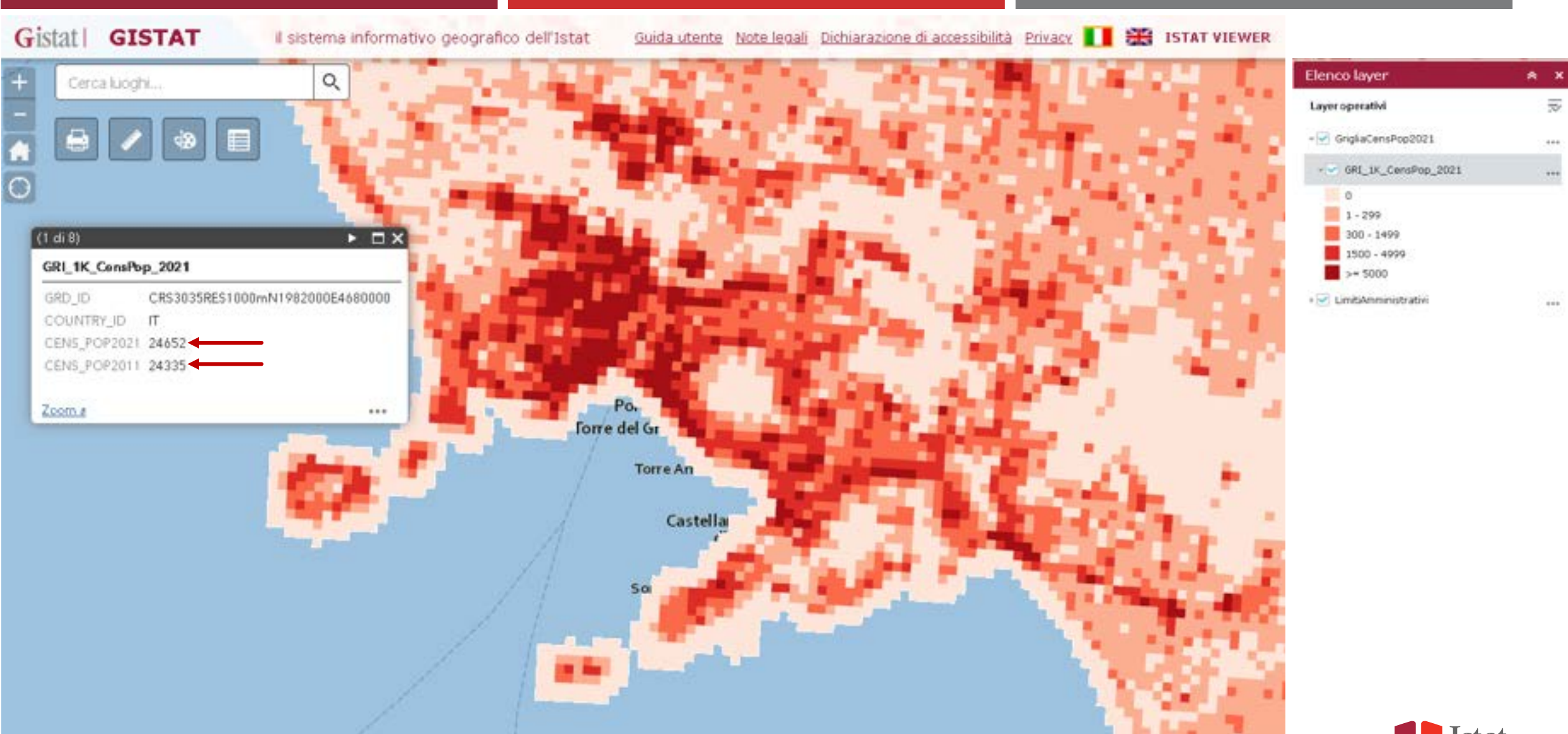
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Population Grids on Gistat

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Population Grids on Gistat: flood in Emilia Romagna

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Population Grids on Gistat: flood in Emilia Romagna

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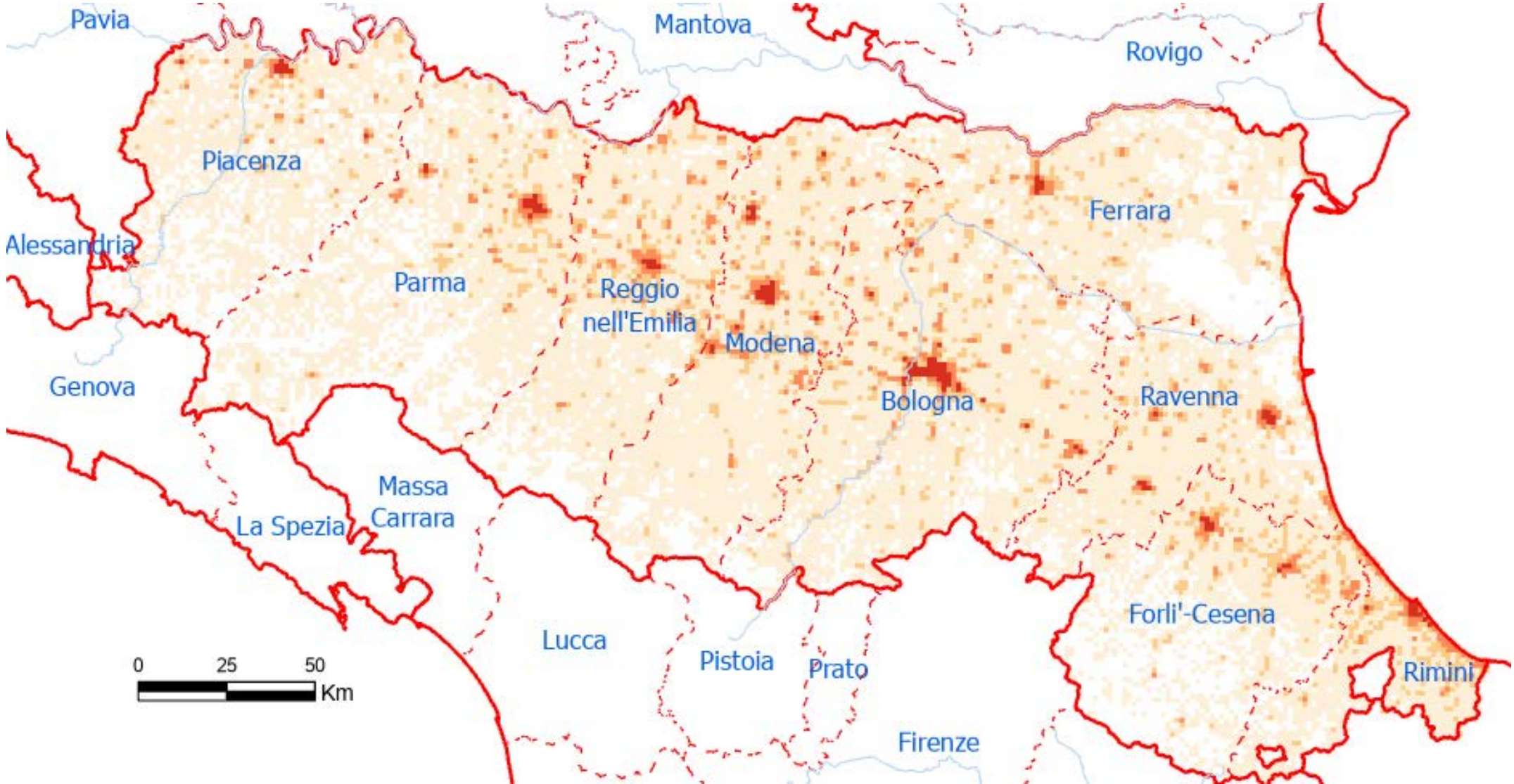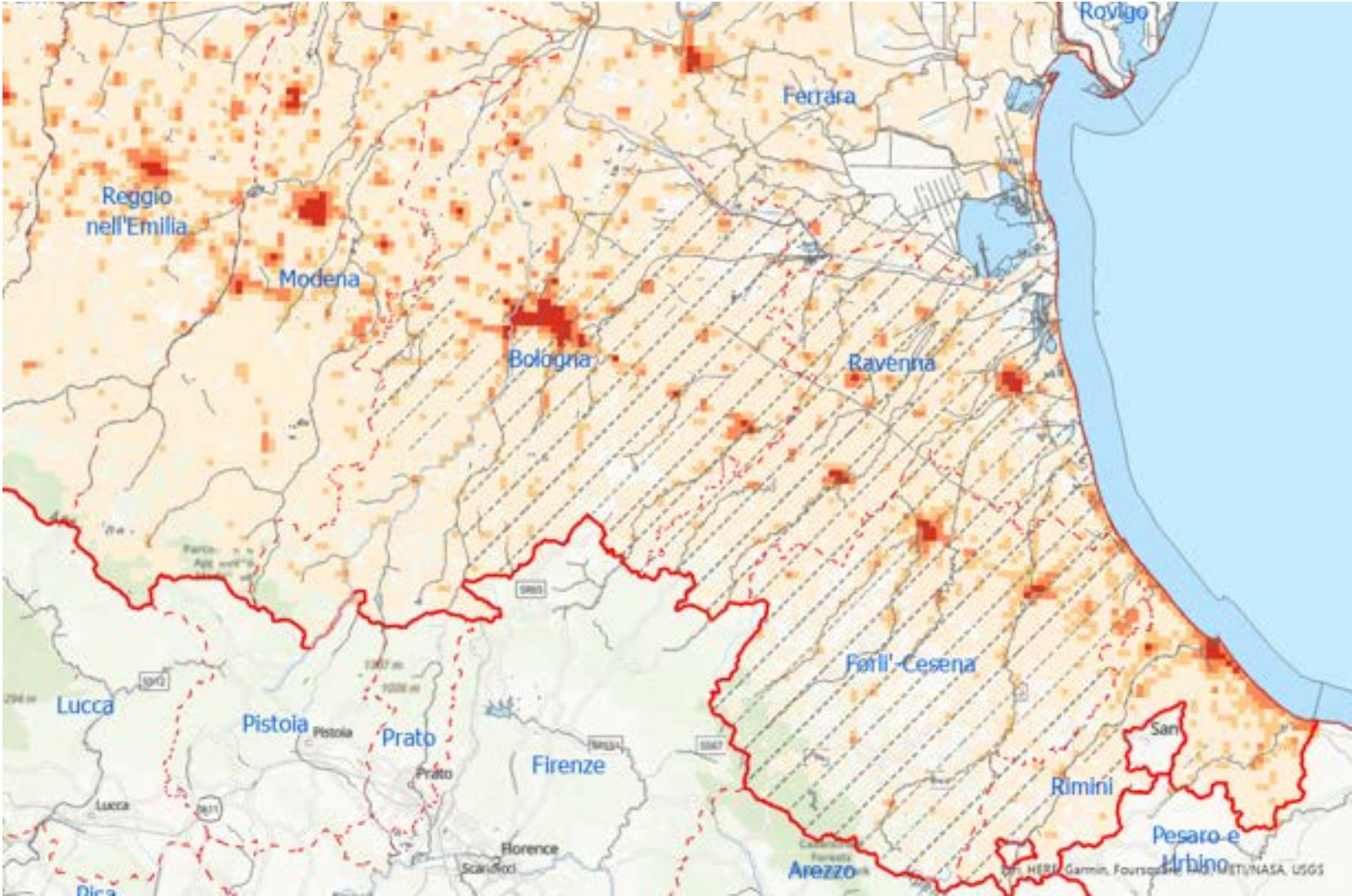
Population Grids on Gistat: fires in Palermo (waste releese) and airpollution

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Climate Change, Disaster and Hazardous events, territorial and geographic data: statistics to not leave behind are necessary and possible

A richer statistical mosaic to integrate the different dimensions promoting improvements in the production of statistical measures inside the national statistical system

From Global to local and from local to global for a common language:

geostatistical and territorial analyses are integration factors becouse in territory the integration among economic, social, environmental, institutional domains could improve looking forward to Climate change, hazardous events and Sustainability

An increasing work in progress… dissemination ready and in the next months:

• Gis tool for Population Grid and for enumeration areas

https://www.istat.it/it/archivio/155162

• Final Population Grid 2021

• Final enumeration areas 2021 considering 2021 Population

Thanks for your attention

Ferruzza@istat.it