

Risk planning and assessment at the regional and urban scale

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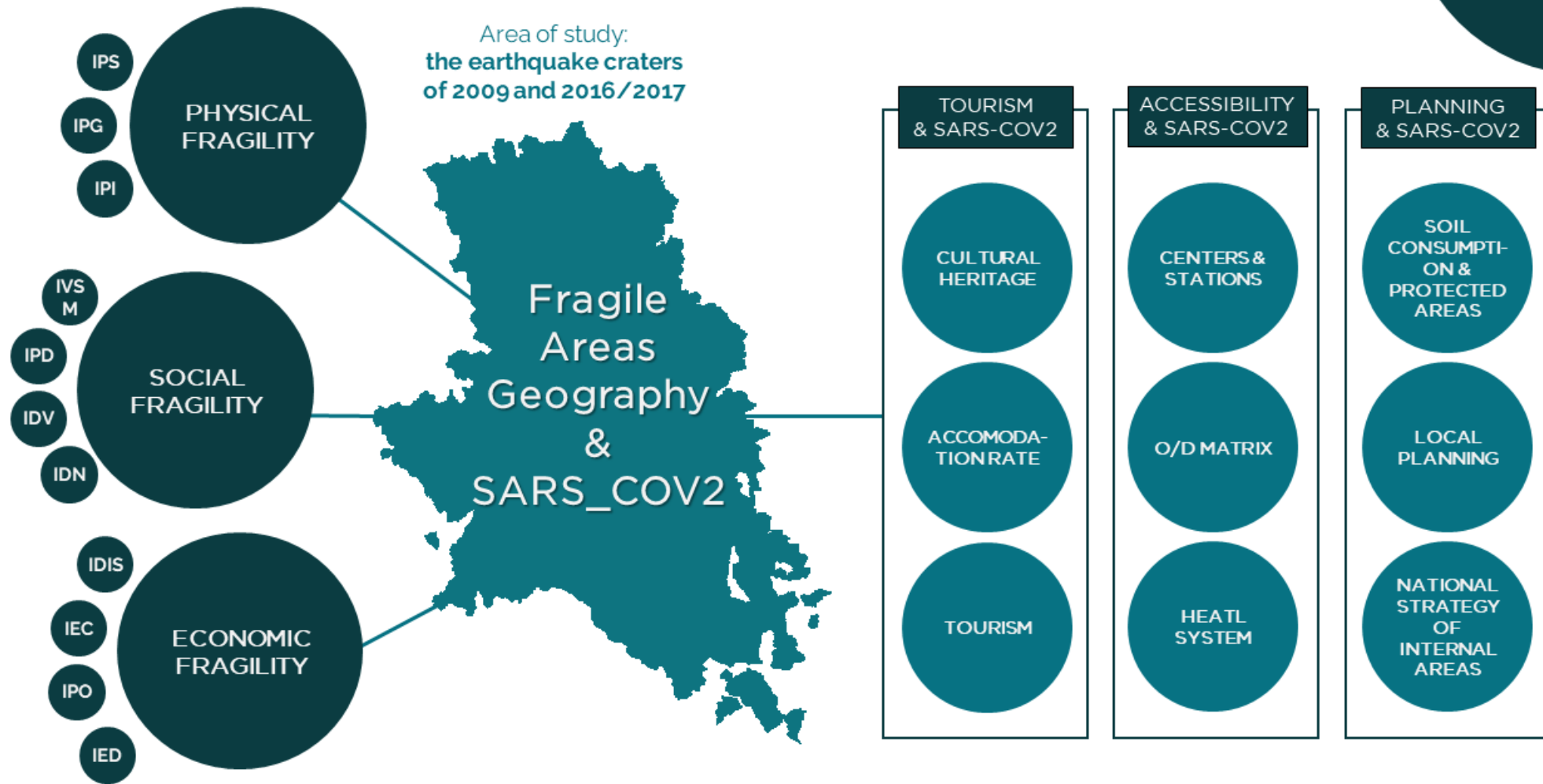
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Regional scale

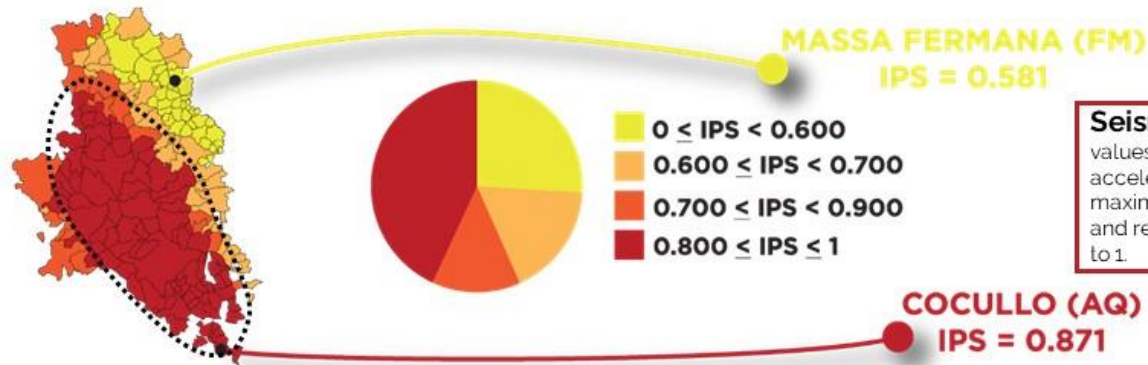
SARS-COV2 In Fragile Areas



Physical Fragility – Seismic Hazard Index

PHISICAL FRAGILITY
IPS

Sources:
ISTAT
ISPRA
INGV



Seismic Hazard Index:
values of a_{gmax} , maximum ground acceleration, are normalized between the maximum and minimum value of the datum and represented in a scale of values from 0 to 1.



$0 \leq \text{IPS} < 0.6$
•47
COMUNI
•26%
TOTALE



$0.6 \leq \text{IPS} < 0.7$
•33
COMUNI
•18%
TOTALE



$0.7 \leq \text{IPS} < 0.8$
•20
COMUNI
•11%
TOTALE



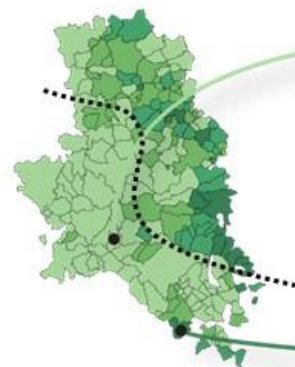
$0.8 \leq \text{IPS} \leq 1$
•83
COMUNI
•45%
TOTALE



Physical Fragility – Hydrogeological Hazard Index

PHISICAL FRAGILITY
IPG

Sources:
ISTAT
ISPRA



0 < IPG < 0.100
0.100 ≤ IPG < 0.300
0.300 < IPG < 0.500
0.500 ≤ IPG ≤ 1

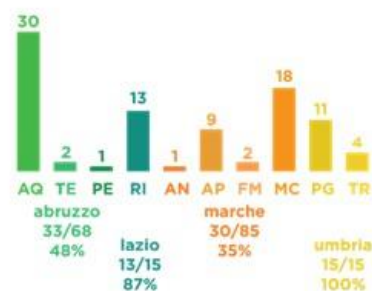
BORBONA (RI)
IPG = 0.000

Hydrogeological Hazard Index:
percentage on the total extension of the municipality of the surfaces falling in HIGH and VERY HIGH Hydrogeological Hazard Areas. The percentage, normalized, varies between 0 and 1.

OVINDOLI (AQ)
IPG = 1



0 < IPG < 0.1
•91
COMUNI
•50%
TOTALE



0.3 < IPG < 0.5
•30
COMUNI
•16%
TOTALE



0.1 < IPG < 0.3
•44
COMUNI
•24%
TOTALE



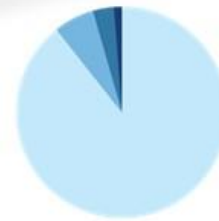
0.5 < IPG < 1
•18
COMUNI
•10%
TOTALE



Physical Fragility – Index of Hydraulic Hazard

PHISICAL FRAGILITY
IPI

Sources:
ISTAT
ISPRA



0 < IPI < 0.050
0.050 < IPI < 0.100
0.100 < IPI < 0.500
0.500 < IPI < 1

CASTELLI (TE)
IPI = 0.000

Index of Hydraulic Hazard:
percentage on the total extension of the municipality of the surfaces falling in Areas of Medium Hydraulic Hazard and HIGH. The percentage, normalized, varies between 0 and 1.

VILLA SANT'ANGELO (AQ)
IPI = 1



0 < IPI < 0.05
•163
COMUNI
•89%
TOTALE



0.1 < IPI < 0.5
•6
COMUNI
•3%
TOTALE



0.05 < IPI < 0.1
•11
COMUNI
•6%
TOTALE



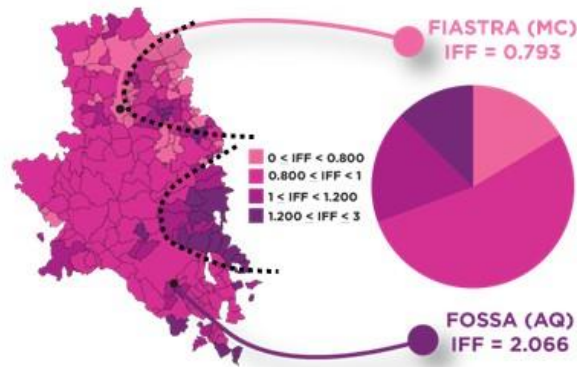
0.5 < IPI < 1
•3
COMUNI
•2%
TOTALE



Physical Fragility Index



Sources:
ISTAT
ISPRA
INGV

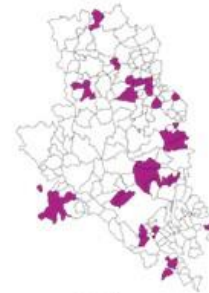


IFF

The Physical Fragility Index (IFF) is the combination of the previously described Indices (IPS, IPG, IPI). The score attributed to the Index of Physical Fragility varies between 0 and 3, where 3 is the maximum value that overall indicates a greater fragility, at the physical level, of the territory. From the graphic representation it is clear that compared to all the municipalities of the Crater there is a clear difference between the physical fragility in the Abruzzo area, especially in Teramo, which has much higher values of IFF, mainly due to the combination of a very high Seismic Hazard (IPS) and Hydrogeological Hazard (IPG).



0 < IFF < 0.8
•33
COMUNI
•18%
TOTALE



1 < IFF < 1.2
•28
COMUNI
•15%
TOTALE



0.8 < IFF < 1
•98
COMUNI
•54%
TOTALE



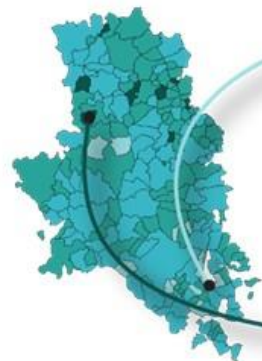
1.2 < IFF < 3
•24
COMUNI
•13%
TOTALE



Social Fragility – Social & Material Vulnerability Index

SOCIAL FRAGILITY
IVSM

Sources:
ISTAT



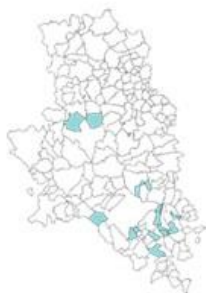
CARAPELLE CALVISIO (AQ)
IVSM = 0.000



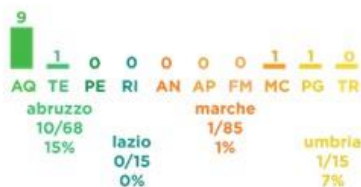
- 0 ≤ IVSM < 0.2
- 0.200 ≤ IVSM < 0.400
- 0.400 ≤ IVSM < 0.600
- 0.600 ≤ IVSM ≤ 1

Index of social and material vulnerability:
the main dimensions of the data are level of education, family structures, housing conditions, participation in the labor market and economic conditions. The values, normalized between the maximum and minimum value of the data are represented on a scale between 0 and 1.

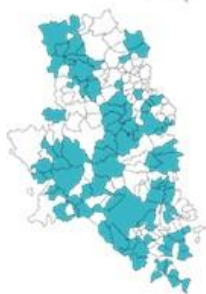
MONTE CAVALLO (MC)
IVSM = 1.000



0 ≤ IVSM < 0.2
•12
COMUNI
•6%
TOTALE



0.4 ≤ IVSM < 0.6
•80
COMUNI
•44%
TOTALE



0.2 ≤ IVSM < 0.4
•82
COMUNI
•45%
TOTALE



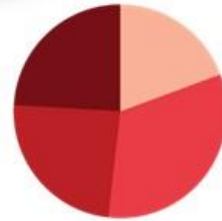
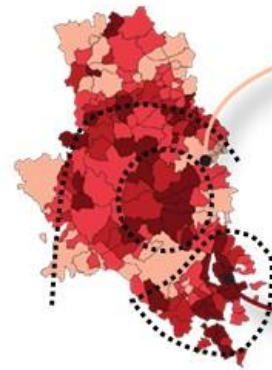
0.6 ≤ IVSM ≤ 1
•9
COMUNI
•5%
TOTALE



Social Fragility – Population Dynamics Index



Sources:
ISTAT



- 0 ≤ IDP < 0.300
- 0.300 ≤ IDP < 0.500
- 0.500 ≤ IDP < 0.600
- 0.600 ≤ IDP ≤ 1

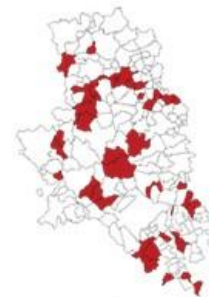
FOLIGNANO (AP)
IDP = 0.000

Population dynamics index: median of the percentage change in population every 10 years from 1951 to 2051. Values, normalized between the maximum and minimum value of the percentage, are represented on a scale between 0 and 1.

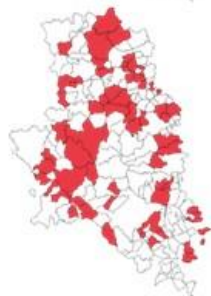
VILLA SANTA LUCIA DEGLI
ABRUZZI (AQ) IDP = 1.000



0 ≤ IDP < 0.3
•36
COMUNI
•20%
TOTALE



0.5 ≤ IDP < 0.6
•40
COMUNI
•22%
TOTALE



0.3 ≤ IDP < 0.5
•62
COMUNI
•34%
TOTALE



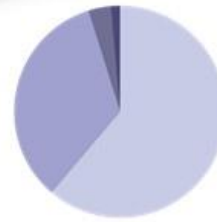
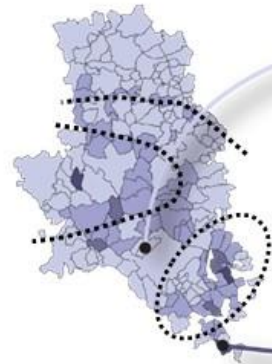
0.6 ≤ IDP ≤ 1
•45
COMUNI
•24%
TOTALE



Social Fragility – Old Age Index



Sources:
ISTAT



- 0 < IDV < 0.100
- 0.100 ≤ IDV < 0.200
- 0.200 ≤ IDV < 0.300
- 0.300 ≤ IDV ≤ 1

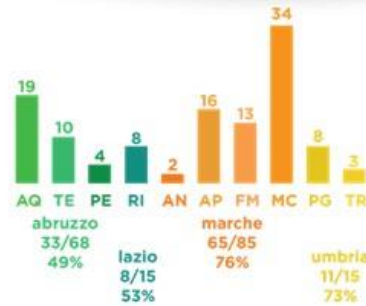
PIZZOLI (AQ)
IDV = 0.039

Old age index: ratio of the population aged 65 and over to the population aged 0-14, multiplied by 100. IDV values, normalized between the maximum and minimum value of the figure are represented on a scale between 0 and 1.

VILLA SANTA LUCIA DEGLI
ABRUZZI (AQ) IDV = 1



0 < IDV < 0.1
• 117
COMUNI
• 64%
TOTALE



0.2 ≤ IDV < 0.3
• 5
COMUNI
• 3%
TOTALE



0.1 ≤ IDV < 0.2
• 58
COMUNI
• 32%
TOTALE



0.3 ≤ IDV ≤ 1
• 3
COMUNI
• 1%
TOTALE



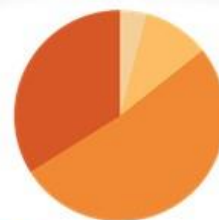
Social Fragility – Birth Rate



Sources:
ISTAT



GAGLIANO ATERNO (AQ)
IDN = 0.000



- 0 < IDN < 0.500
- 0.500 ≤ IDN < 0.700
- 0.700 ≤ IDN < 0.900
- 0.900 ≤ IDN ≤ 1

Birth rate: ratio between the number of live births and the average amount of the resident population, multiplied by 1000. Values were normalized between the maximum and minimum value and represented on a scale between 0 and 1.

USSITA (MC)
IDN = 1



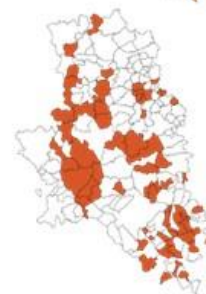
0 < IDN < 0.5
•7
COMUNI
•4%
TOTALE



0.7 ≤ IDN < 0.9
•93
COMUNI
•51%
TOTALE



0.5 ≤ IDN < 0.7
•16
COMUNI
•9%
TOTALE



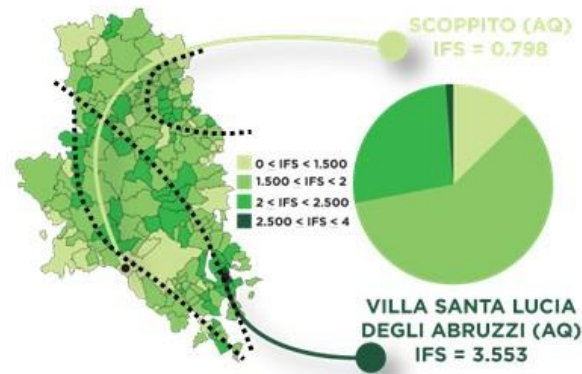
0.9 ≤ IDN ≤ 1
•67
COMUNI
•36%
TOTALE



Social Fragility Index



Sources:
ISTAT



IFS

The Index of Social Fragility (IFS) is the combination of the previously described Indices (IVSM, IDP, IDV, IDN). The score attributed to the Social Fragility Index varies between 0 and 4, where 4 is the maximum value that overall indicates greater fragility at the social level of the territory.

The graphic representation shows how in the 183 municipalities of the earthquake crater there is a homogeneous distribution of the various levels of fragility. Most municipalities have medium and medium-high values of IFS.



0 < IFS < 1.5

•28
COMUNI
•15%
TOTALE



1.5 < IFS < 2

•105
COMUNI
•83%
TOTALE



2 < IFS < 2.5

•49
COMUNI
•27%
TOTALE



2.5 < IFS < 4

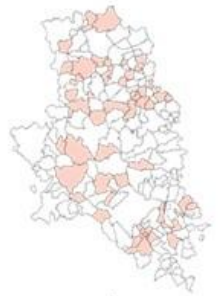
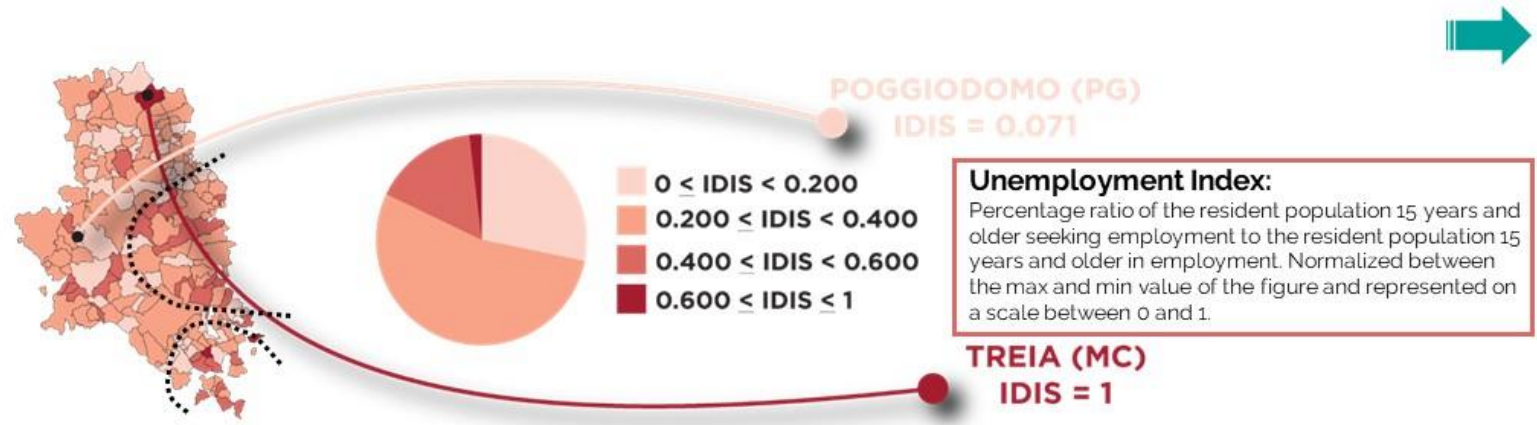
•1
COMUNI
•1%
TOTALE



Economic Fragility – Unemployment Index



Sources:
ISTAT



0 ≤ IDIS < 0.2
•52
 COMUNI
•28%
 TOTALE



0.4 ≤ IDIS < 0.6
•32
 COMUNI
•17%
 TOTALE



0.2 ≤ IDIS < 0.4
•96
 COMUNI
•53%
 TOTALE



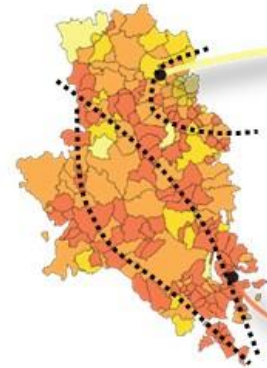
0.6 ≤ IDIS ≤ 1
•3
 COMUNI
•2%
 TOTALE



Economic Fragility – Index of Economic Inertia



Sources:
ISTAT



- 0 < IEC < 0.300
- 0.300 ≤ IEC < 0.500
- 0.500 ≤ IEC < 0.700
- 0.700 ≤ IEC ≤ 1

COLMURANO (MC)
IEC = 0.281

Index of economic inertia: calculated from the average of the percentages of employees in agriculture, manufacturing, commerce and services over the total population. Obtained by normalizing between 0 and 1 the values obtained from the average.

VILLA SANTA LUCIA DEGLI
ABRUZZI (AQ) IEC = 1



0 < IEC < 0.3
•7
COMUNI
•4%
TOTALE



0.5 ≤ IEC < 0.7
•60
COMUNI
•33%
TOTALE



0.3 ≤ IEC < 0.5
•23
COMUNI
•12%
TOTALE



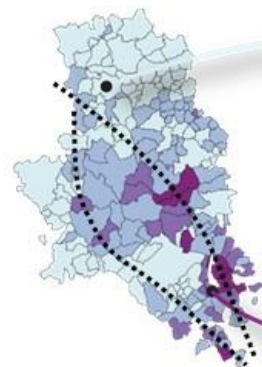
0.7 ≤ IEC ≤ 1
•93
COMUNI
•51%
TOTALE



Economic Fragility – Poverty Index



Sources:
ISTAT



- 0 ≤ IPO < 0.300
- 0.300 ≤ IPO < 0.500
- 0.500 ≤ IPO < 0.700
- 0.700 ≤ IPO ≤ 1

CAMERINO (MC)
IPO = 0,107

Poverty index: percentage of the total population with an income of less than € 10,000. The percentage was then normalized between the maximum and minimum value of the data and represented on a scale between 0 and 1.

CARAPELLE CALVISIO (AQ)
IPO = 1



0 ≤ IPO < 0.3
•84
COMUNI
•46%
TOTALE



0.5 ≤ IPO < 0.7
•21
COMUNI
•12%
TOTALE



0.3 ≤ IPO < 0.5
•70
COMUNI
•38%
TOTALE



0.7 ≤ IPO < 1
•8
COMUNI
•4%
TOTALE



Economic Fragility – Digital Exclusion Index



Sources:
ISTAT



- 0 < IED < 0.300
- 0.300 < IED < 0.500
- 0.500 < IED < 0.700
- 0.700 < IED < 1

NAVELLI (AQ)
IED = 0.000

Digital Exclusion Index:
Percentage of population excluded from fixed and mobile broadband, also normalized between the maximum and minimum value of the figure and represented on a scale between 0 and 1.

BOLOGNOLA (MC)
IED = 1



0 < IED < 0.3
•107
COMUNI
•58%
TOTALE



0.5 < IED < 0.7
•17
COMUNI
•9%
TOTALE



0.3 < IED < 0.5
•18
COMUNI
•10%
TOTALE



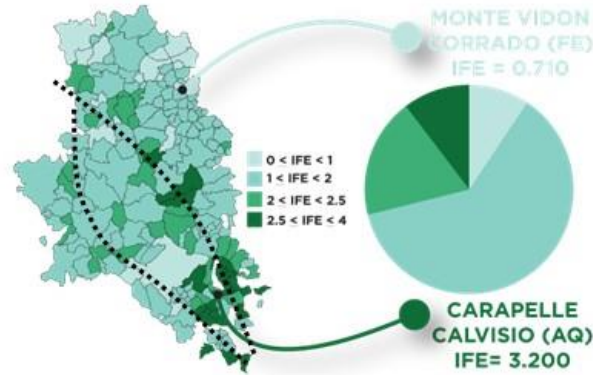
0.7 < IED < 1
•41
COMUNI
•23%
TOTALE



Economic Fragility Index



Sources:
ISTAT

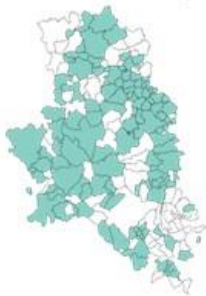


IFE

The Index of Economic Fragility (IFE) is the combination of the previously described Indices (IDIS, IEC, IPO, IE). The score attributed to the Index of Economic Fragility varies between 0 and 4, where 4 is the maximum value that overall indicates a greater fragility, at the economic level, of the territory. From the graphical representation it can be seen that in the 183 municipalities of the Crater there is greater economic fragility in the municipalities of Abruzzo, in particular in the Teramo area and in the area east of the province of L'Aquila. On the contrary, also comparing the percentages with respect to the number of municipalities involved, the Marche region has lower values than the IFE, confirming the positive trend also found in the previous elaborations of the 85 municipalities involved.



0 < IFE < 1
 •19
 COMUNI
 •10%
 TOTALE



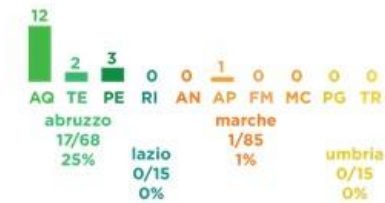
1 < IFE < 2
 •114
 COMUNI
 •62%
 TOTALE



2 < IFE < 2.5
 •32
 COMUNI
 •18%
 TOTALE



2.5 < IFE < 4
 •18
 COMUNI
 •10%
 TOTALE

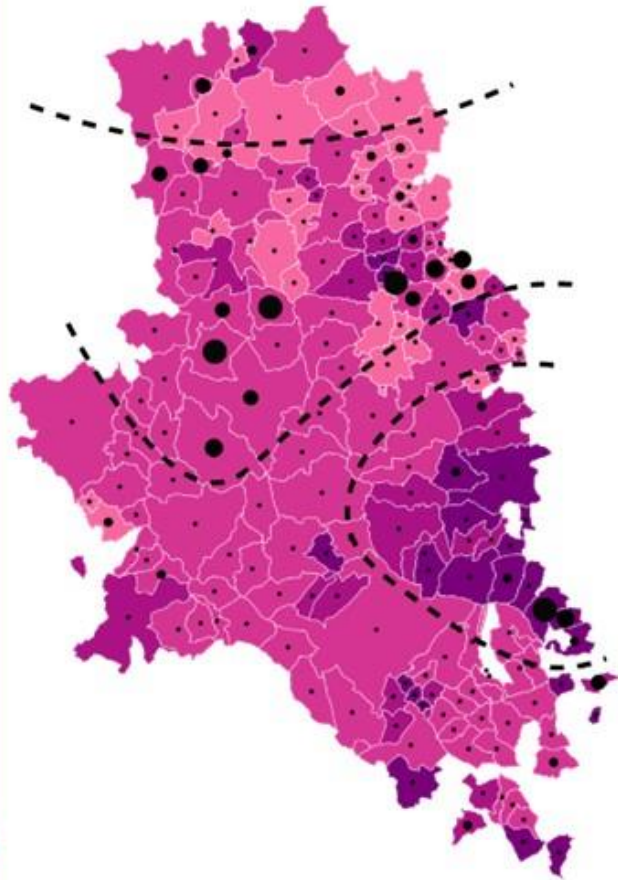


OVERLAY BETWEEN SARS_COV2 & FRAGILITY SYNTHETIC INDEXES

POSITIVE DENSITY_DPOS_SarsCov2
_updated to 08|26th: pos/inhab

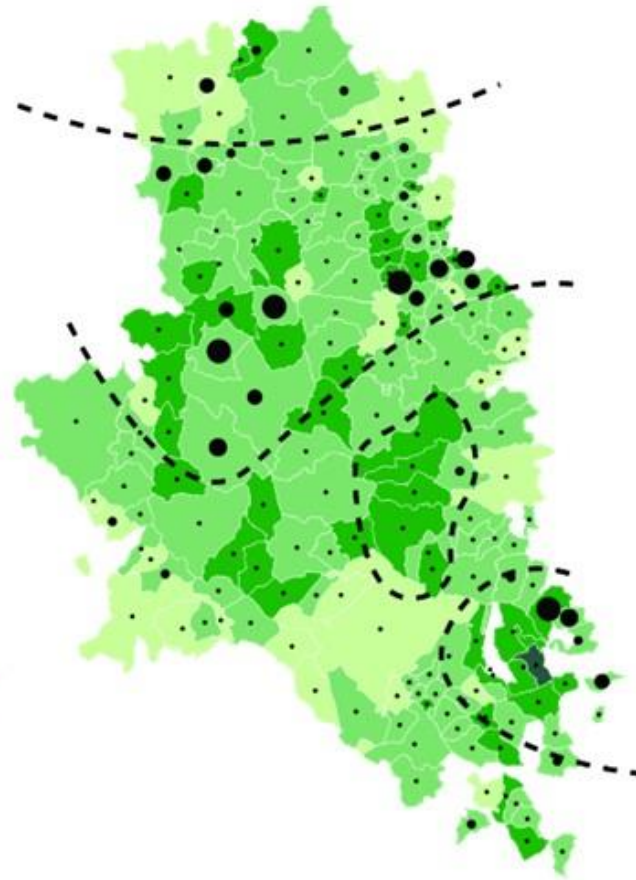
- 0% < DPOS < 1%
- 1% < DPOS < 2%
- 2% < DPOS < 3%
- 3% < DPOS < 4%
- DPOS > 4%

DEFINITION OF THE PHENOMENON



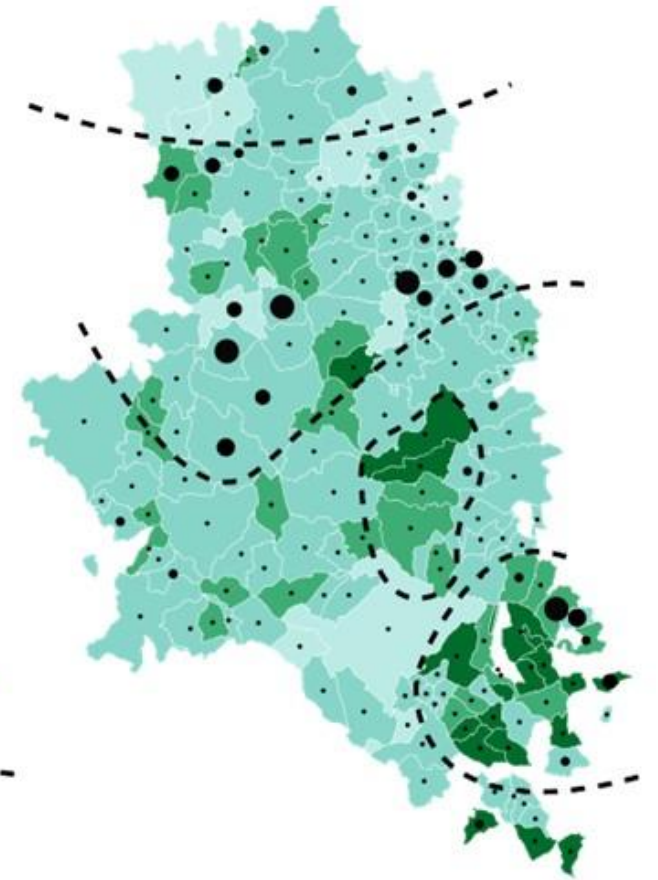
PHYSICAL FRAGILITY INDEX_IFF

- 0 < IFF < 0.800
- 0.800 < IFF < 1
- 1 < IFF < 1.200
- 1.200 < IFF < 4



SOCIAL FRAGILITY INDEX_IFS

- 0 < IFS < 1.500
- 1.500 < IFS < 2
- 2 < IFS < 2.500
- 2.500 < IFS < 4



ECONOMIC FRAGILITY INDEX_IFE

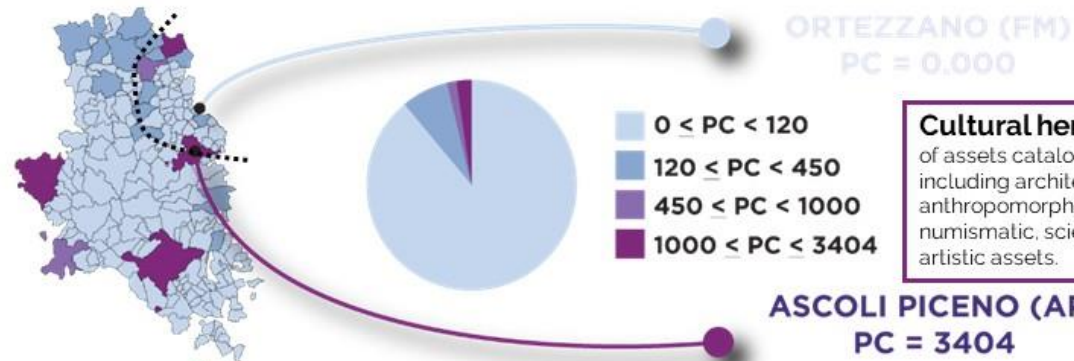
- 0 < IFE < 1
- 1 < IFE < 2
- 2 < IFE < 2.500
- 2.500 < IFE < 4



Tourism – Cultural Heritage



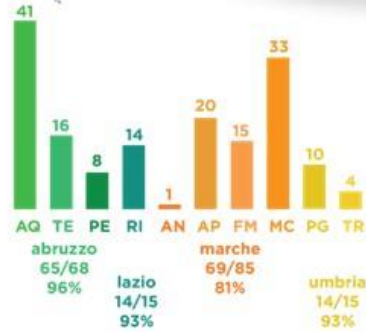
Sources:
ISTAT
Mibact



Cultural heritage: The indicator collects the number of assets catalogued by the Ministry of Cultural Heritage, including architectural and landscape, archaeological, anthropomorphic, photographic, musical, naturalistic, numismatic, scientific and technological, historical and artistic assets.



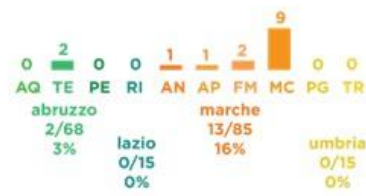
0 < PC < 120
•162
COMUNI
•89%
TOTALE



450 < PC < 1000
•2
COMUNI
•1%
TOTALE



120 < PC < 450
•15
COMUNI
•8%
TOTALE



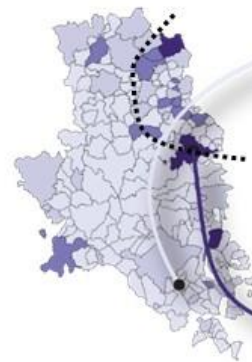
1000 < PC < 3404
•4
COMUNI
•2%
TOTALE



Tourism – Density of cultural heritage



Sources:
ISTAT
Mibact



VILLA SANT'ANGELO (AQ)
DPC = 0.000



- 0 ≤ DPC < 0.100
- 0.100 ≤ DPC < 0.350
- 0.350 ≤ DPC < 0.700
- 0.700 ≤ DPC ≤ 1

Density of cultural heritage: the indicator is given by the normalized ratio between the number of assets cataloged by the Mibact (architectural and landscape, archaeological, ethno-anthropomorphic, photographic, etc.) and the municipal area (sq. km). It varies between 0 and 1.

ASCOLI PICENO (AP)
DPC = 1.000



0 ≤ DPC < 0.100
•142
COMUNI
•77%
TOTALE



0.350 ≤ DPC < 0.700
•13
COMUNI
•7%
TOTALE



0.100 ≤ DPC < 0.350
•25
COMUNI
•14%
TOTALE



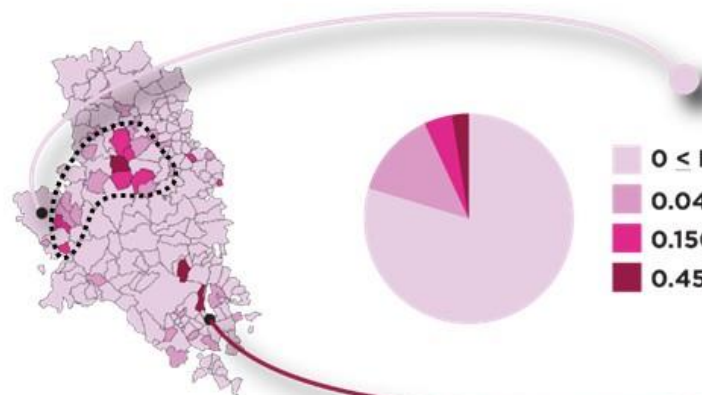
0.700 ≤ DPC ≤ 1
•3
COMUNI
•2%
TOTALE



Tourism – Composite Accommodation Function Rate



Sources:
ISTAT
Mibact



SPOLETO (PG)
RIC = 0.002

Composite accommodation function rate:
the indicator is given by the normalized ratio between the number of hotel beds multiplied by 10,000 and the product of resident population and municipal area (square kilometers). It varies between 0 and 1.

- 0 < RIC < 0.040
- 0.040 < RIC < 0.150
- 0.150 < RIC < 0.450
- 0.450 < RIC < 1

SANTO STEFANO DI SESSANIO (AQ)
RIC = 1.000



0 < RIC < 0.040
•147
COMUNI
•80%
TOTALE



0.150 < RIC < 0.450
•8
COMUNI
•4%
TOTALE



0.040 < RIC < 0.150
•25
COMUNI
•14%
TOTALE



0.450 < RIC < 1
•3
COMUNI
•2%
TOTALE



Tourism Index



Sources:
ISTAT
Mibact



- 0 < TUR < 0.015
- 0.015 ≤ TUR < 0.100
- 0.100 ≤ TUR < 0.250
- 0.250 ≤ TUR < 1

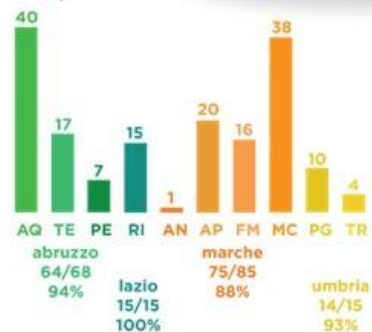
NORCIA (PG)
TUR = 0.000

Degree of tourism: normalized ratio between the total annual number of visitors to state-owned cultural sites (fortified architecture, monuments, museums and galleries, churches and places of worship, etc.) and the municipal area (square kilometers). Varies between 0 and 1.

ASCOLI PICENO (AP)
TUR = 0.501



0 ≤ TUR < 0.015
•170
COMUNI
•92%
TOTALE



0.100 ≤ TUR < 0.250
•3
COMUNI
•2%
TOTALE



0.015 ≤ TUR < 0.100
•6
COMUNI
•3%
TOTALE



0.250 ≤ TUR < 1
•5
COMUNI
•3%
TOTALE

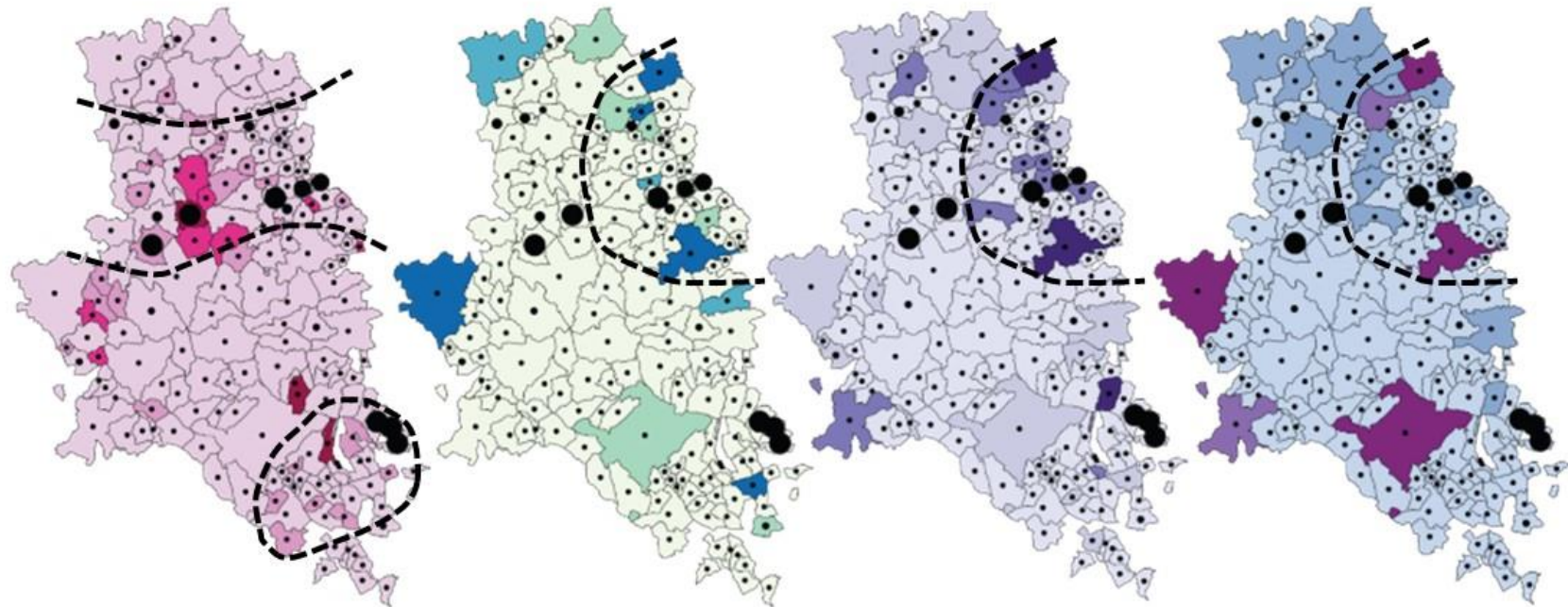


Tourism & Sars_Cov2

TOURISM & SARS-COV2

POSITIVE DENSITY (DPOS)_SarcCov2_update26|05: positivi/ab

0% ≤ DPOS < 1% 1% ≤ DPOS < 2% 2% ≤ DPOS < 3% DPOS ≥ 4%



Accommodation function rate



Degree of tourism



Density of cultural heritage



Cultural heritage



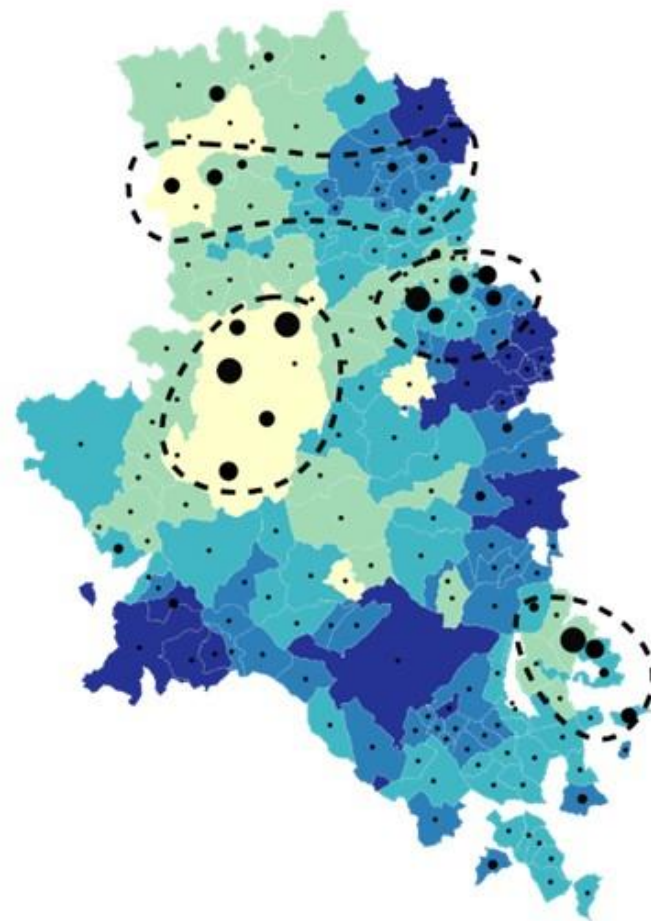
Sources:
ISTAT
ISPRA
INGV
Mibact
Ministero della Salute
ISS

OVERLAY BETWEEN SARS_COV2 & ACCESSIBILITY INDEXES

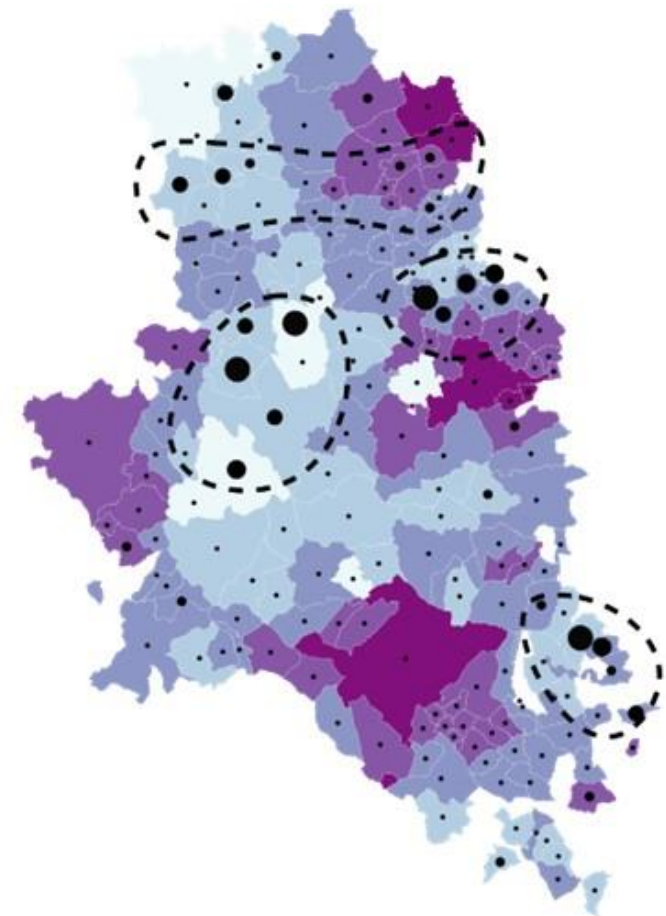
POSITIVE DENSITY_DPOS_SarsCov2
_updated to 08|26th: pos/Inhab

- 0% < DPOS < 1%
- 1% < DPOS < 2%
- 2% < DPOS < 3%
- 3% < DPOS < 4%
- DPOS > 4%

DEFINITION OF THE PHENOMENON



CENTERS ACCESSIBILITY INDEX



STATIONS ACCESSIBILITY INDEX

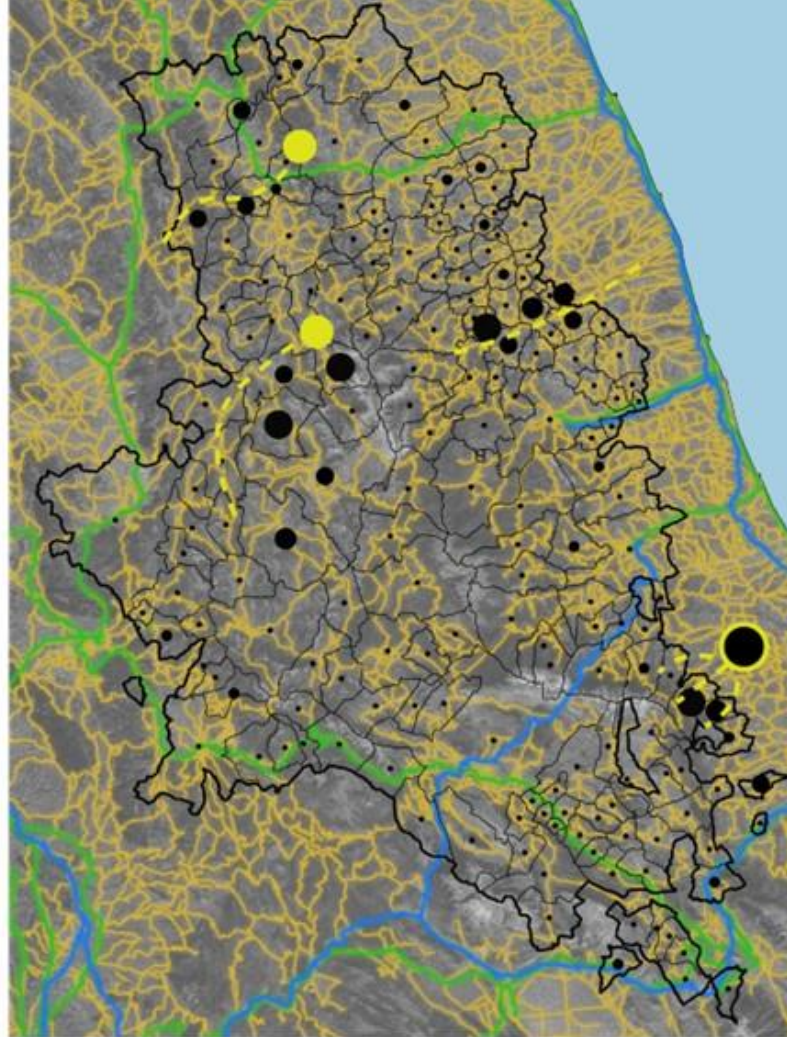


OVERLAY BETWEEN SARS_COV2 & O/D MATRIX

POSITIVE DENSITY_DPOS_SarsCov2_updated to 08|26th: pos/inhab

- 0% < DPOS < 1%
- 1% < DPOS < 2%
- 2% < DPOS < 3%
- 3% < DPOS < 4%
- DPOS > 4%

DEFINITION OF THE PHENOMENON



INFRASTRUCTURES

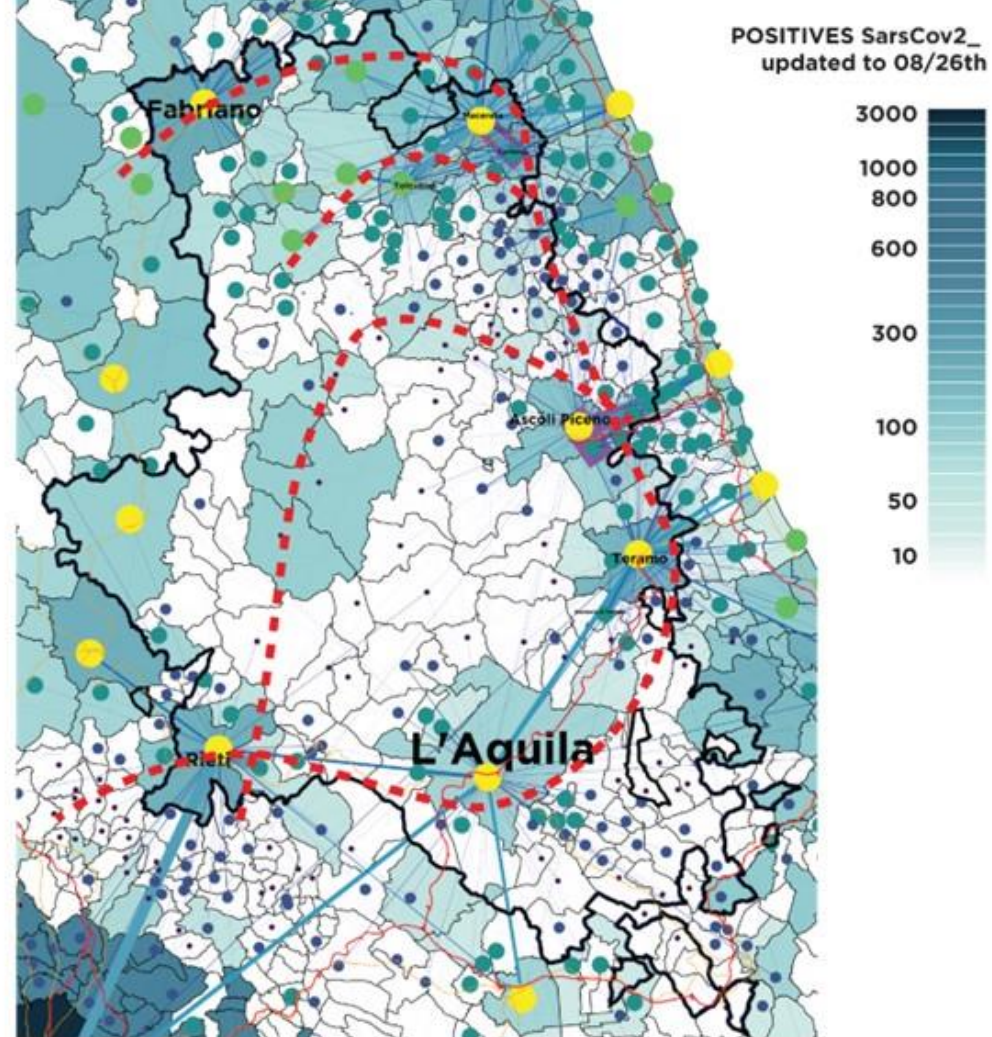
- RAILWAY
- HIGHWAY
- REGIONAL HIGHWAY
- COUNTY ROAD



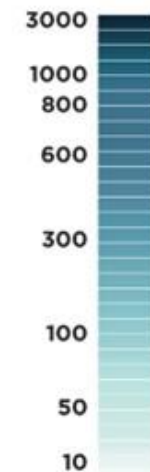
TANK



TERMINAL



POSITIVES SarsCov2_ updated to 08/26th



STUDY AND WORK FLOWS

- 1 - 65
- 65 - 256
- 256 - 555
- 555 - 1125
- 1125 - 2668

CLASSIFICATION OF THE MUNICIPALITY

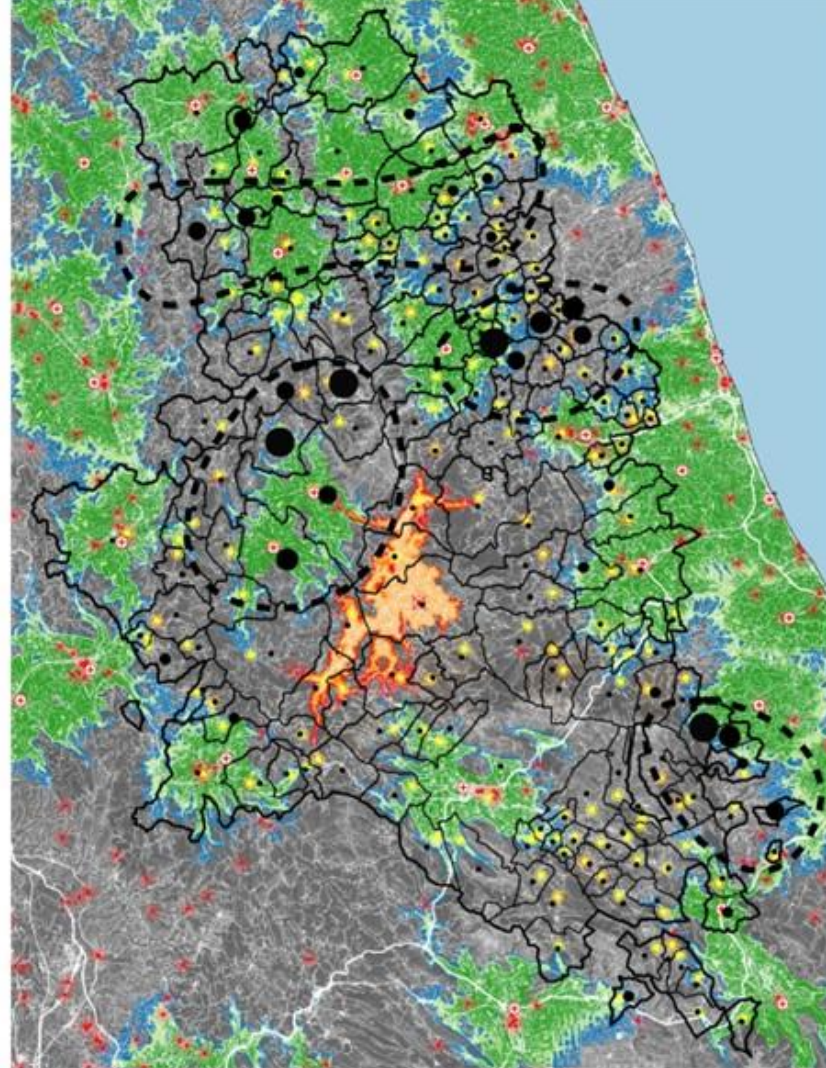
- A - POLO
- B - INTERMUNICIPAL POLE
- C - BELT
- D - INTERMEDIATE
- E - PERIPHERICAL

OVERLAY BETWEEN SARS_COV2 & HEALT SYSTEM

POSITIVE DENSITY_DPOS_SarsCov2
_updated to 08|26th: pos/inhab

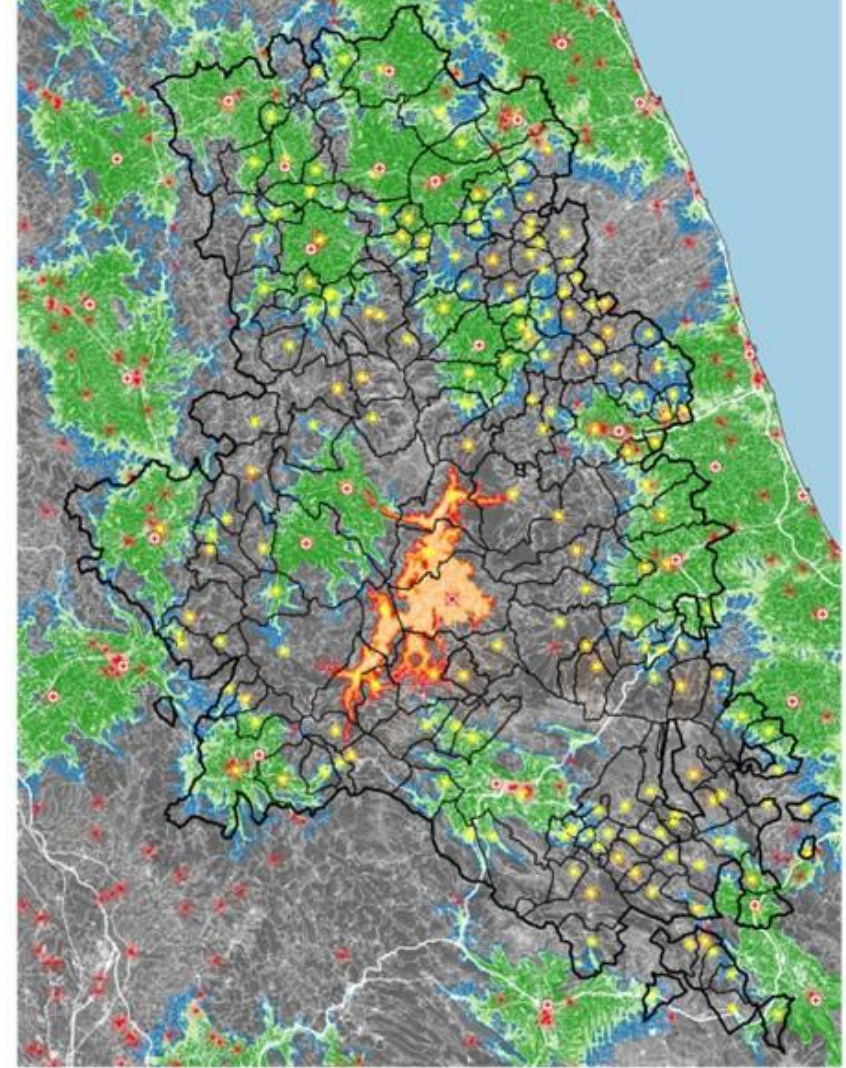
- 0% < DPOS < 1%
- 1% < DPOS < 2%
- 2% < DPOS < 3%
- 3% < DPOS < 4%
- DPOS ≥ 4%

DEFINITION OF THE PHENOMENON



ACCESSIBILITY TO THE HEALTH SYSTEM
Isochrone Active Hospitals

- 18 MINUTES
- 21 MINUTES
- 25 MINUTES



Isochrone Non - Active Hospitals

- 18 MINUTES
- 21 MINUTES
- 25 MINUTES

• Hospitals

⊙ Closed Hospitals

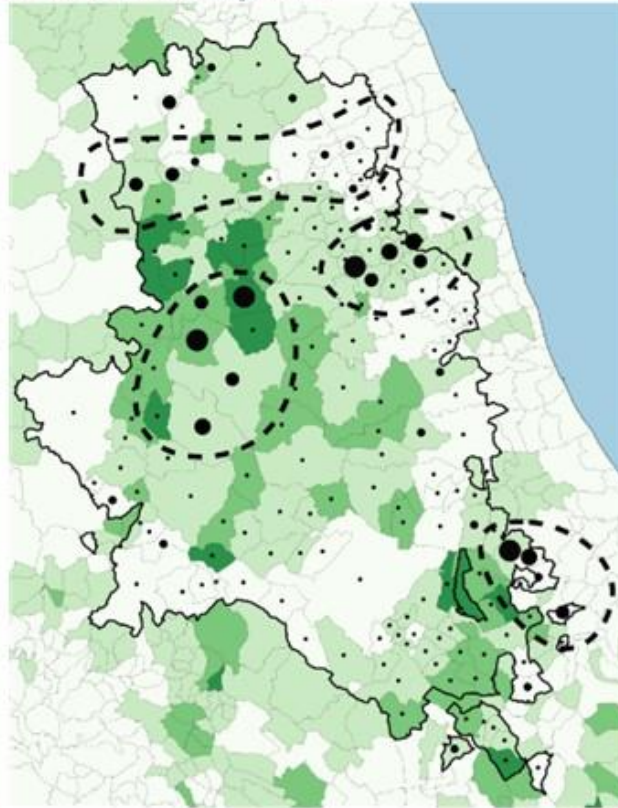
OVERLAY BETWEEN SARS_COV2 & PLANNING

POSITIVE DENSITY_DPOS_SarsCov2_updated to 08|26th: pos/Inhab

- 0% < DPOS < 1%
- 1% < DPOS < 2%
- 2% < DPOS < 3%
- 3% < DPOS < 4%
- DPOS ≥ 4%

DEFINITION OF THE PHENOMENON

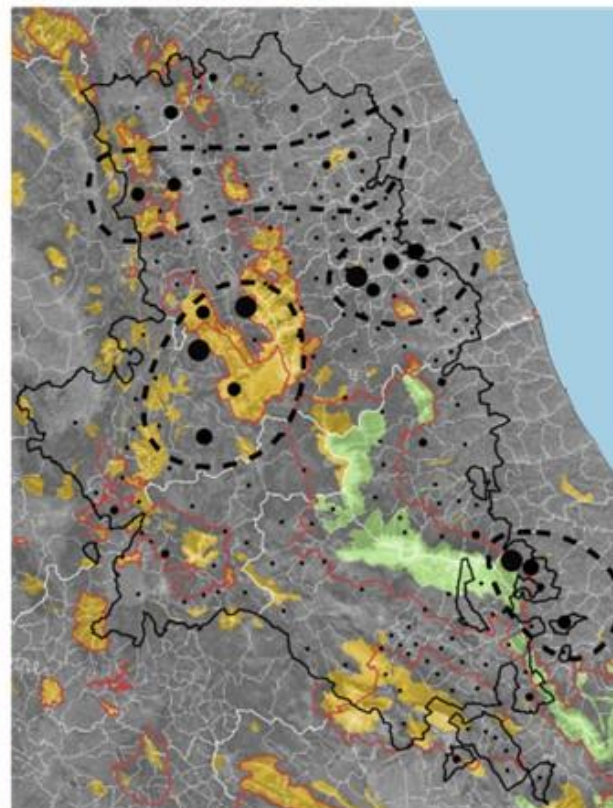
SARS-COV2 & Soil Consumption



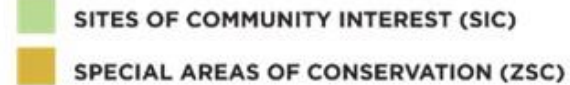
SOIL CONSUMPTION (m²/inhab)



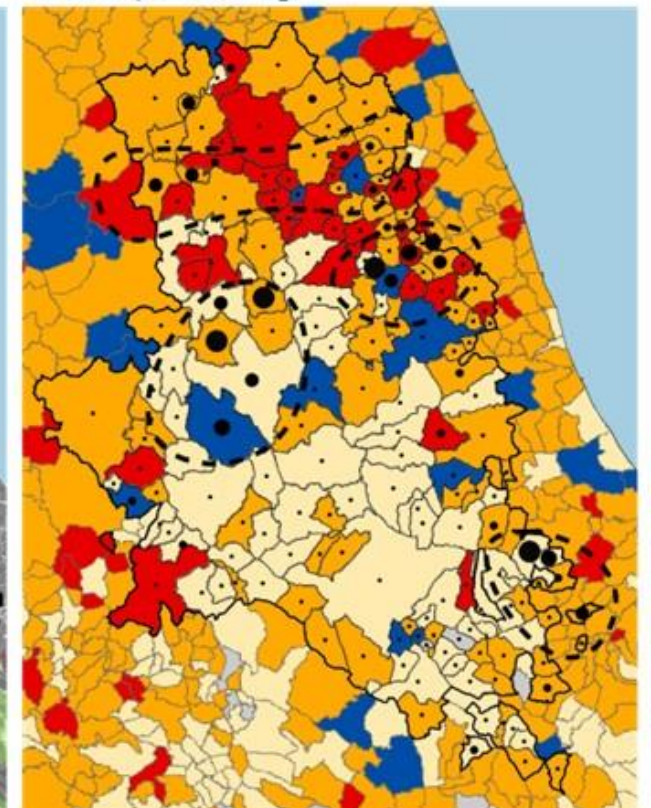
SARS-COV2 & Protected Areas



PROTECTED AREAS



SARS-COV2 & Local planning



LOCAL PLANNING - Year of approval



Conclusions

The first results described, allow us to highlight some phenomena in terms of issues:

- A persistent **isolation** of the territories that present **a high fragility**, not only related to physical infrastructures but also to digital or telecommunications infrastructures, made even more evident with the analysis of the distribution of Sars-Cov-2.
- The **fragility of the system of relations** between the territories of the crater that in project terms will require a system of governance and alliances that will necessarily have to face the territorial rebalancing to ensure accessibility and therefore the use, for example tourism, developing the **integration** of fragile contexts with the strong ones.
- The **gap** that characterizes the system of **territorial and proximity services**, which leaves open important questions such as health.



Urban scale

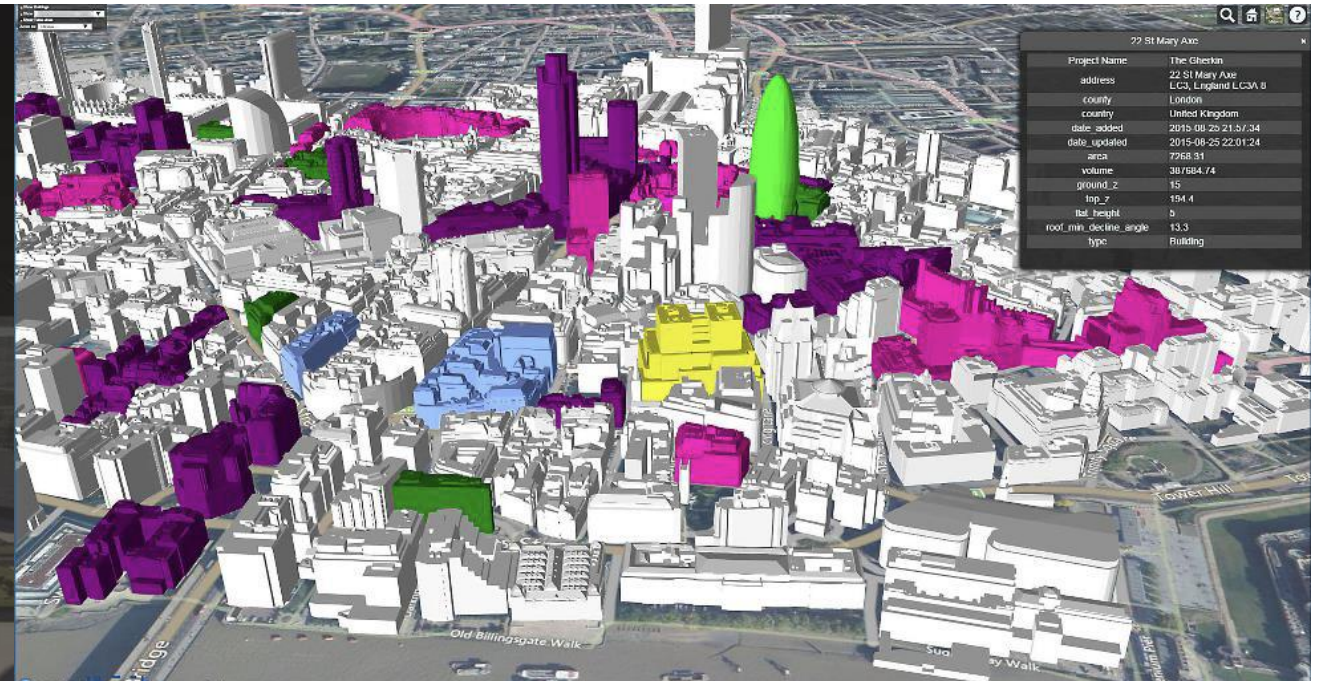
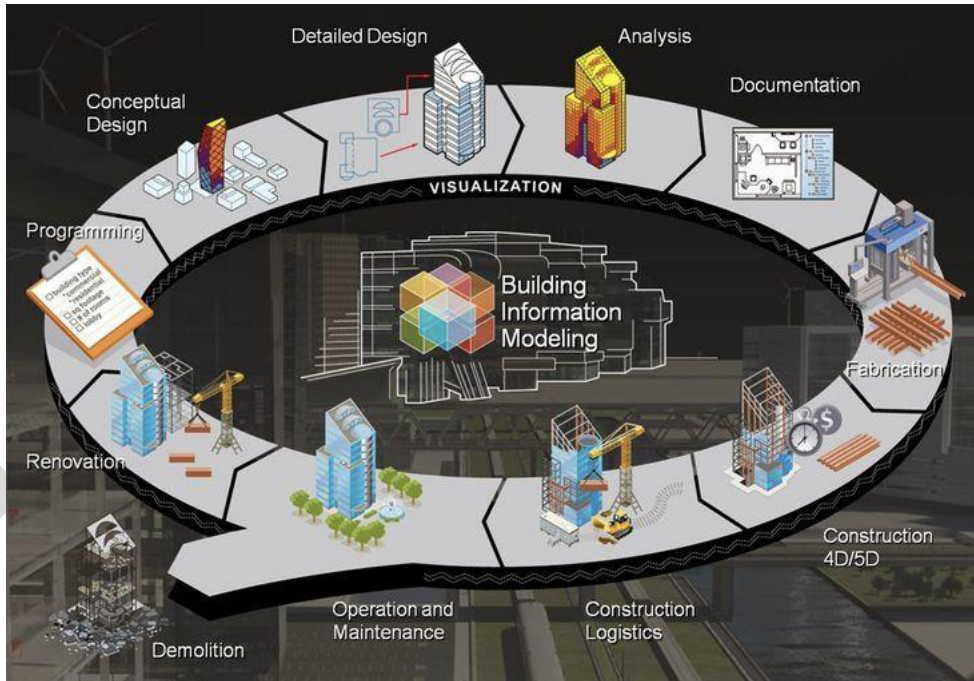
Building Information Modeling

ISO 19650:2019 defines BIM as: Use of a shared digital representation of a built asset to facilitate design, construction and operation processes to form a reliable basis for decisions.



City Information Modeling

Use of a shared 3D digital representation of a city asset to facilitate design, assessment and management processes and form a reliable basis for decision-making.



The information base of the CIM is the 3D GIS, in which the information concerns all 3D surfaces. The three-dimensional elements representing constructions (buildings, infrastructures, etc.) are connected to their BIM

City Information Modeling

uses

CIM is first a knowledge tool of the city, but the research experience of the University of L'Aquila is directing CIM also to these 3 uses:

City **DESIGN**

Urban Design, Cost Evaluation, Design Management, etc.

City design **ASSESSMENT**

Urban Performance Assessment, Urban Environmental Assessment, Urban Risk Assessment, etc.

City **MANAGEMENT**

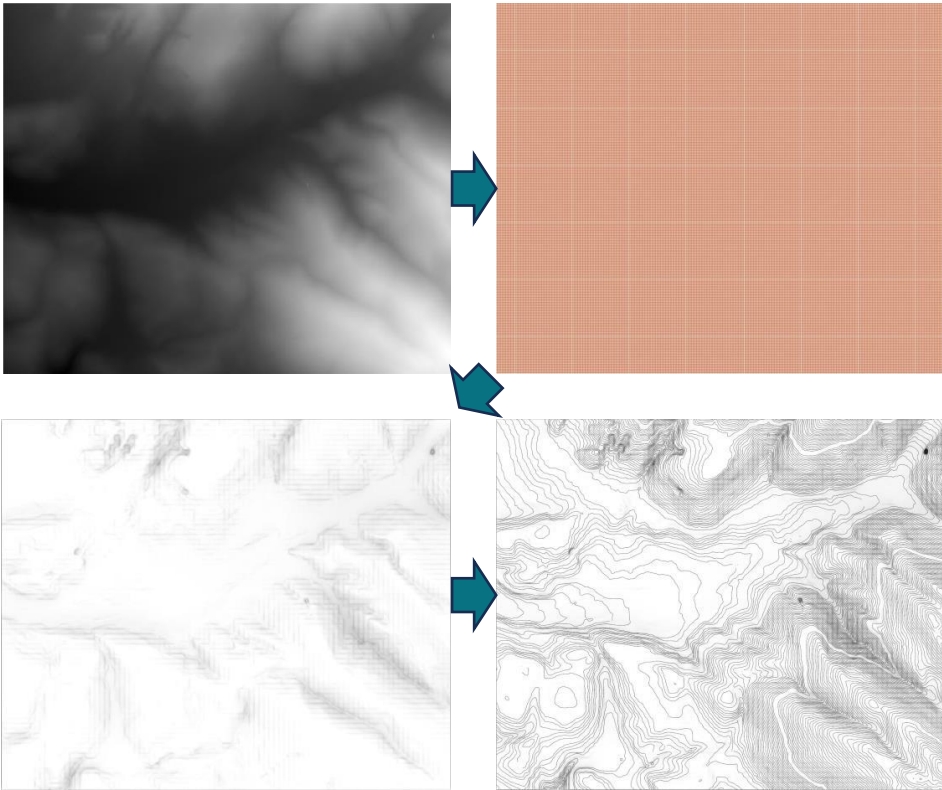
Evacuation planning and management, emergency management, safety, mobility, etc.

City Information Modeling

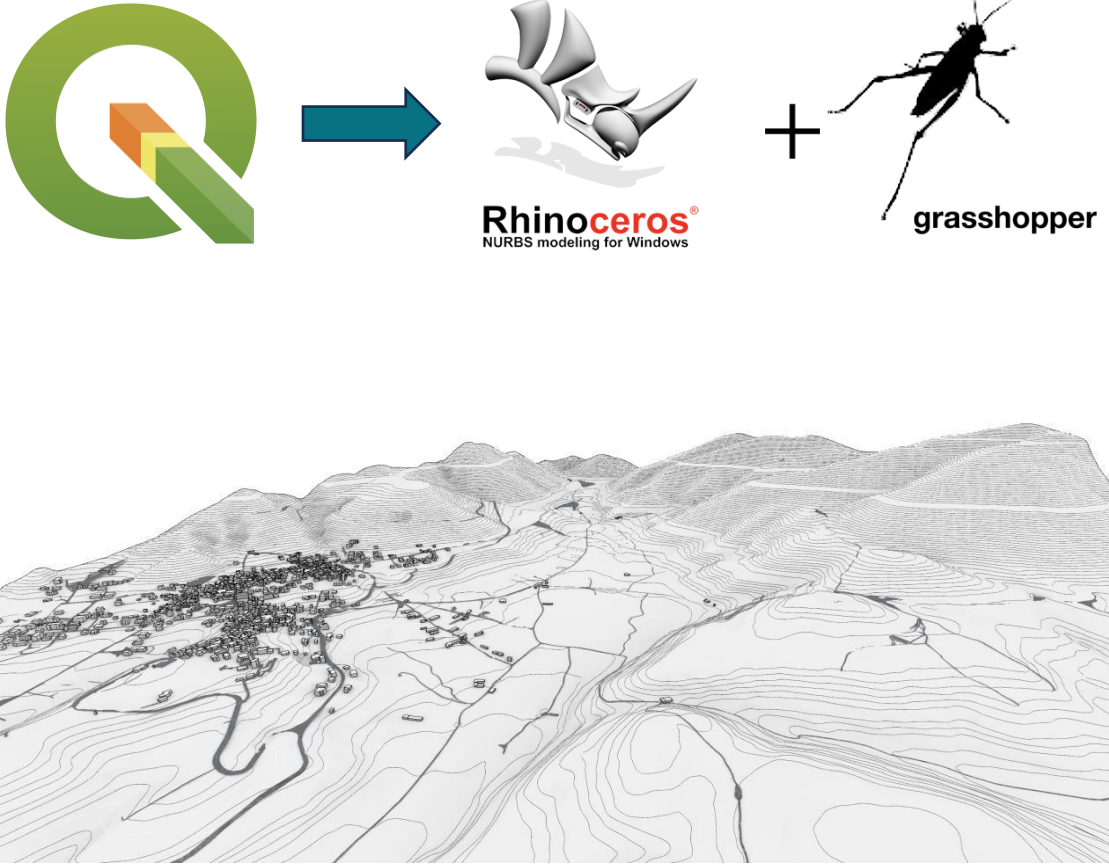
data sources

- **3D base MAP** (3d GIS at the City Scale)
- **BIM Model** (replaces the GIS volume of the constructions)
- **SCIENTIFIC ANALYSIS** (specific scientific research on the city)
- **SOCIO-ECONOMIC DATA** (e.g. linked to individual constructions)
- **SATELLITE DATA**
- **SENSORS -REAL TIME DATA**
- **URBAN DESIGN** and **URBAN PLANNING** (design data)

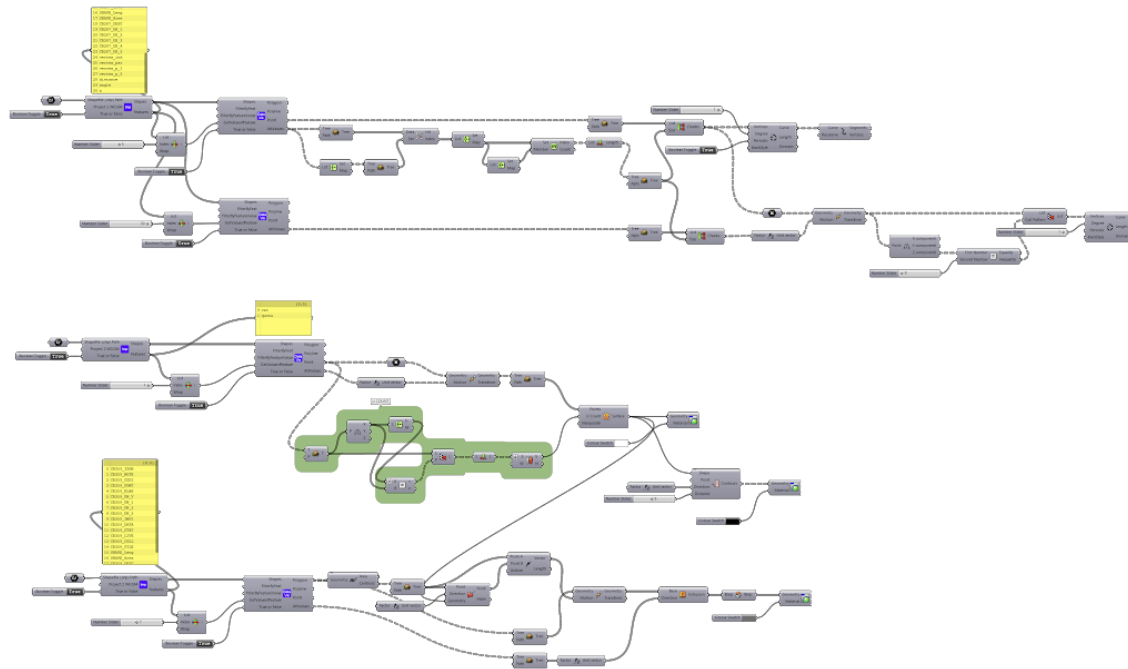
City Information Modeling



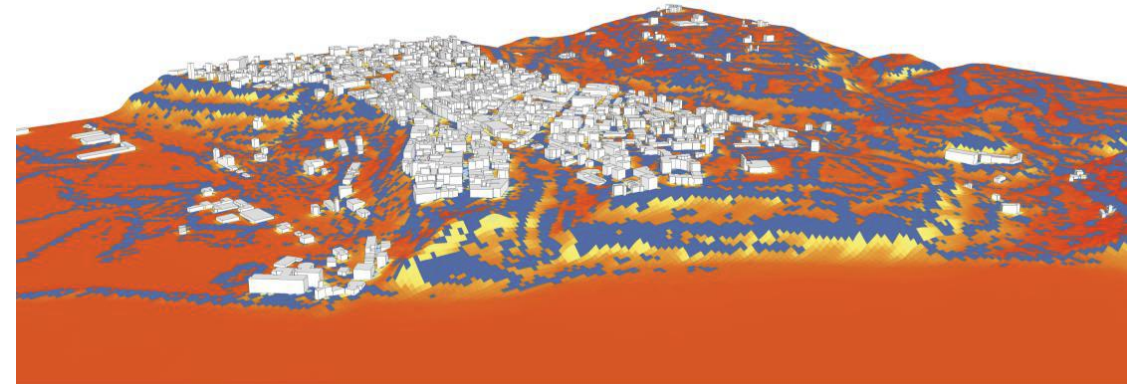
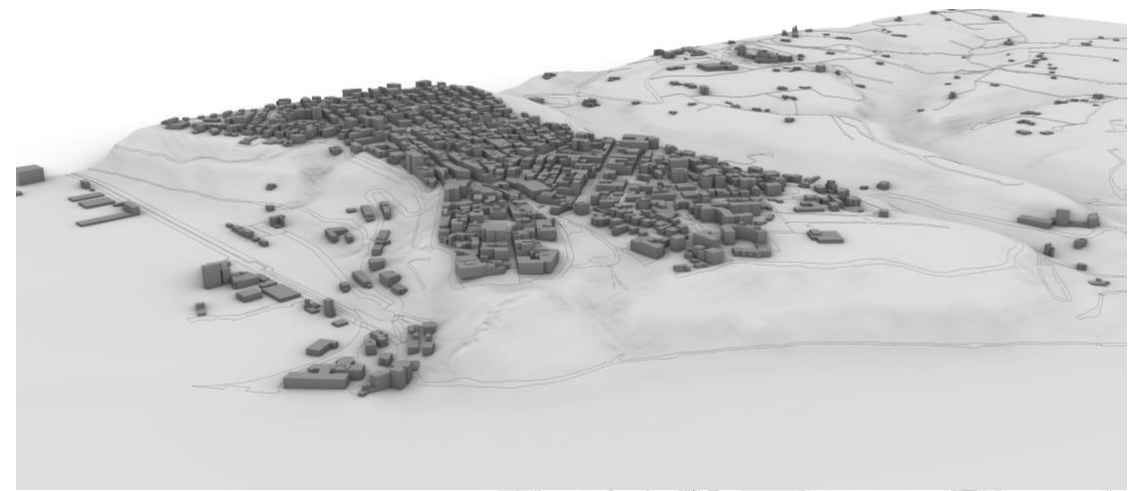
From Digital TerrainModel (DTM) to 3D model



City Information Modeling



Visual scripting in Grasshopper towards automatic 3D modeling



City Information Modeling

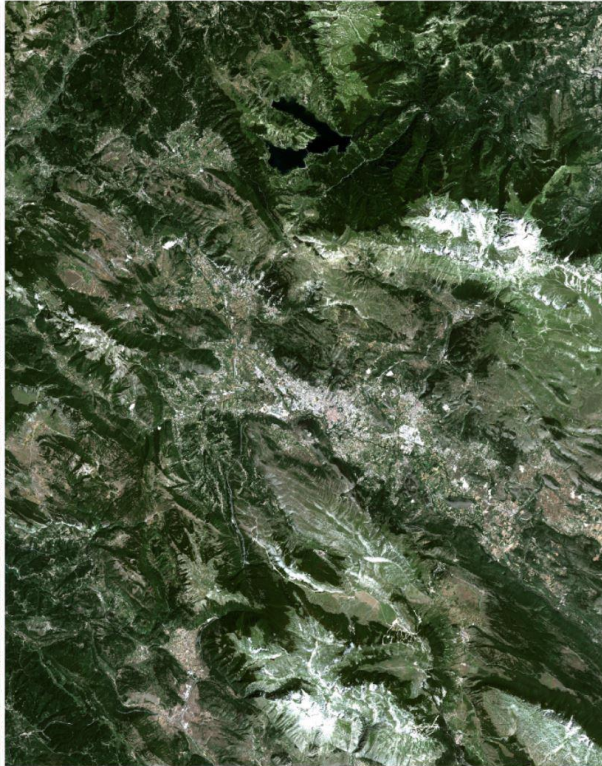
Worldview II



1. **COASTAL** Band (400-450 nm)
2. **BLUE** Band (450-510 nm)
3. **GREEN** Band (510-580 nm)
4. **YELLOW** Band (585-625 nm)
5. **RED** Band (630-690 nm)
6. **RED-EDGE** Band (705-745 nm)
7. **NIR1** Band (770-895 nm)
8. **NIR2** Band (860-1040 nm)

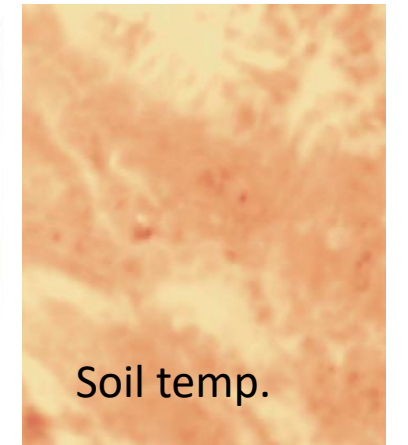
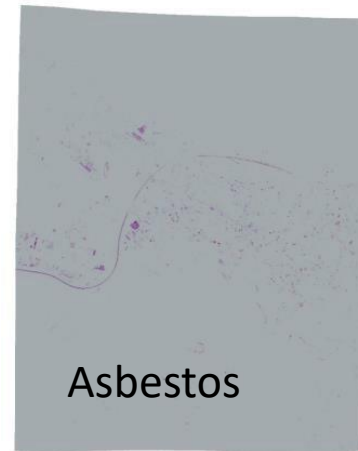
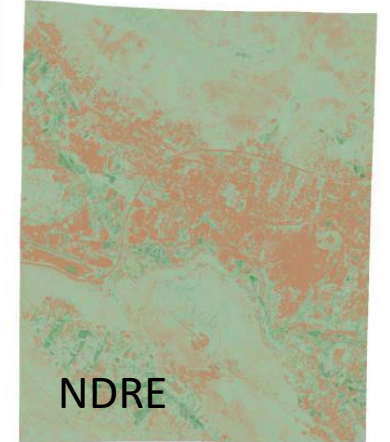
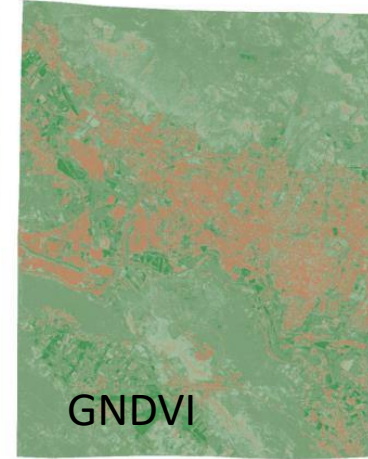
Dimensione Pixel:
 - Pancromatico 0,46 metri
 - Multispettrale 1,84 metri

Landsat 8



1. **COASTAL AEROSOL** Band (435-451 nm)
2. **BLUE** Band (452-512 nm)
3. **GREEN** Band (533-590 nm)
4. **RED** Band (636-673 nm)
5. **NEAR INFRARED NIR** (851-879 nm)
6. **SWIR 1** (1566-1651 nm)
7. **SWIR 2** (2107-2294 nm)
8. **PANCHROMATIC** (503-676 nm)
9. **CIRRUS** (1363-1384 nm)
10. **THERMAL INFRARED (TIRS) 1** (10600-11190 nm)
11. **THERMAL INFRARED (TIRS) 2** (11500-12510 nm)

Dimensione Pixel:
 - Pancromatico 15 metri
 - Multispettrale 30 metri
 - Termico 100 metri



City Information Modeling

Next Steps

- As seen in the slides, our research considered only a few uses of CIM and considered only a few data sources.
- In the next steps we will continue this experimentation in order to realize an integrated BIM/CIM environment.
- In another line of research we will also extend the concept of CIM to the Land, to constitute Land Information Modeling.

City Information Modeling & Land Information Modeling

Thank you for your attention! 😊