

Mapping urban gardens



Research team

**Italia
Nostra**
ONLUS

sezione milano nord
cintura metropolitana



POLITECNICO
MILANO 1863

DIPARTIMENTO DI ARCHITETTURA
E STUDI URBANI



PI:

Italia Nostra Onlus - Sezione Milano Nord

Mario Cucchi - coordinatore
Luisa Toeschi
Silvio Anderloni
Gabriella Balice
Davide Risso

PARTNER:

DAStU - Dipartimento di Architettura e Studi Urbani Politecnico di Milano

Antonio Longo - responsabile scientifico
Daniela Gambino
Fabio Manfredini - laboratorio MAUD
Paolo Dilda - laboratorio MAUD
hanno partecipato alla ricerca con attività di tirocinio gli studenti:
Flora Gadda, Chiara Chisari, Rosa Rapacciuolo e Germana Regazzoni

Scuola Agraria del Parco di Monza

Pio Rossi

DEMM – Dipartimento Economia, Management e Metodi quantitativi Universita' degli Studi di Milano

Massimo Peri - responsabile scientifico
Luisa Anderloni
Alessandra Tanda
ha collaborato alla ricerca: Fabio Garavaglia

altri soggetti co-finanziatori:

Studio legale Leone - Torrani e Associati

Roberta Farci
Erika Mussetti

LEONE - TORRANI E ASSOCIATI

Fondazione
CARIPLO

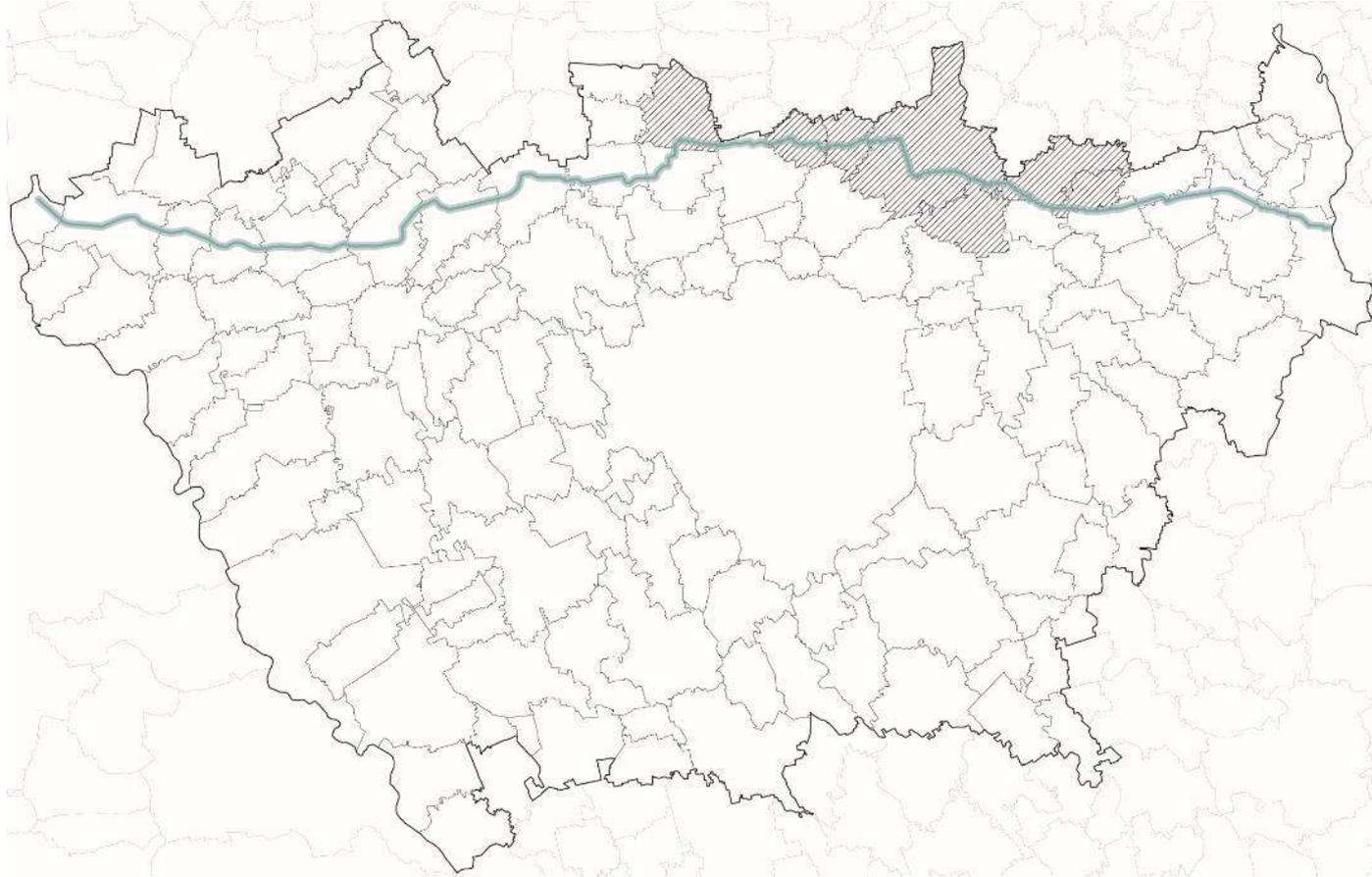


Iniziativa sostenuta da **FONDAZIONE CARIPLO – Settore Ambiente**

- Urban gardens «from above»: **mapping through photointerpretation urban gardens, generation of an original spatial database, classification of urban gardens**
- Municipal urban gardens : **on line questionnaires**
- Urban gardens «from below»: **surveys**
- Estimation of urban gardens' **production**
- **Cost benefit** analysis
- **Rules analysis**
- **Research Perspectives**

- **Report**
- **Maps and spatial database**
- **Narrations and stories of surveys**
- **The atlas** of urban gardens, with thematic analysis, based on the **spatial database**
- **Statistics and economic evaluation** on production, on families spending, on food behaviours

The study area



133 + 7 Comuni

Abbiategrasso	Boffalora sopra Ticino	Casarile	Corbetta	Inveruno	Mesero	Pantigliate	Robecco sul Naviglio	Settimo Milanese	Vimodrone
Agrate Brianza (MB)	Bollate	Casorezzo	Cormano	Inzago	Milano	Parabiago	Rodano	Solaro	Vittuone
Albairate	Bresso	Cassano d'Adda	Cornaredo	Lacchiarella	Monza (MB)	Paullo	Rosate	Trezzano Rosa	Vizzolo Predabissi
Arconate	Brugherio (MB)	Cassina de' Pecchi	Corsico	Lainate	Morimondo	Pero	Rozzano	Trezzano sul Naviglio	Zelo Surrigone
Arese	Bubbiano	Cassinetta di Lugagnano	Cuggiono	Legnano	Motta Visconti	Peschiera Borromeo	San Donato Milanese	Trezzo sull'Adda	Zibido San Giacomo
Arluno	Buccinasco	Castano Primo	Cusago	Limbiate (MB)	Muggiò (MB)	Pessano con Bornago	San Giorgio su Legnano	Tribiano	
Assago	Buscate	Cernusco sul Naviglio	Cusano Milanino	Liscate	Nerviano	Pieve Emanuele	San Giuliano Milanese	Truccazzano	
Baranzate	Bussero	Cerro al Lambro	Dairago	Locate di Triulzi	Nosate	Pioltello	San Vittore Olona	Turbigo	
Bareggio	Busto Garolfo	Cerro Maggiore	Dresano	Magenta	Nova Milanese (MB)	Pogliano Milanese	San Zenone al Lambro	Vanzaghello	
Basiglio	Calvignasco	Cesano Boscone	Gaggiano	Magnago	Novate Milanese	Pozzo d'Adda	Santo Stefano Ticino	Vanzago	
Bellinzago Lombardo	Cambiago	Cesate	Garbagnate Milanese	Marcallo con Casone	Noviglio	Pozzuolo Martesana	Sedriano	Vaprio d'Adda	
Bernate Ticino	Canegrate	Cinisello Balsamo	Gessate	Masate	Opera	Pregnana Milanese	Segrate	Vermezzo	
Besate	Caponago (MB)	Cislino	Gorgonzola	Mediglia	Ossona	Rescaldina	Senago	Vernate	
Binasco	Carpiano	Cologno Monzese	Grezzago	Melegnano	Ozzero	Rho	Sesto San Giovanni	Vignate	
	Carugate	Colturano	Gudo Visconti	Melzo	Paderno Dugnano	Robecchetto con Induno	Settala	Villa Cortese	

Spatial database

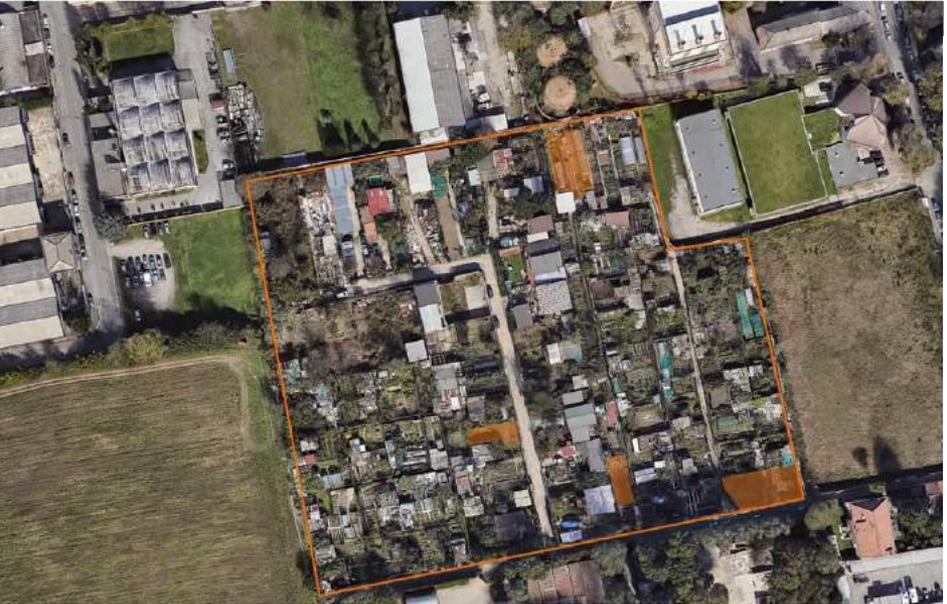
Complex methodology

Generation of the first map from different existing sources:

- il **Dusaf4** (Regione Lombardia **Land use map - 2012**), available through the Regione Lombardia Geoportal – class available: “orti familiari”;
- **OpenStreetMap (OSM febbraio 2015)**, open source map (database) of the world
- Research results “**ReLambro. Il fiume nuova infrastruttura ecologica della metropoli milanese**” (2015), on the ecological network along Lambro river (ERSAF, DASTU - Politecnico di Milano, Comune di Milano, Lega Ambiente e Plis Parco Media Valle Lambro) supported by Fondazione Cariplo;
- **Municipality of Milano**, urban gardens managed by Municipality of Milano (2016).

Photointerpretation and classification of urban gardens (2017).

Different typologies



The city of urban gardens



Spatial distribution



2.255

number

20%

% within urban area (Dusaf2015)

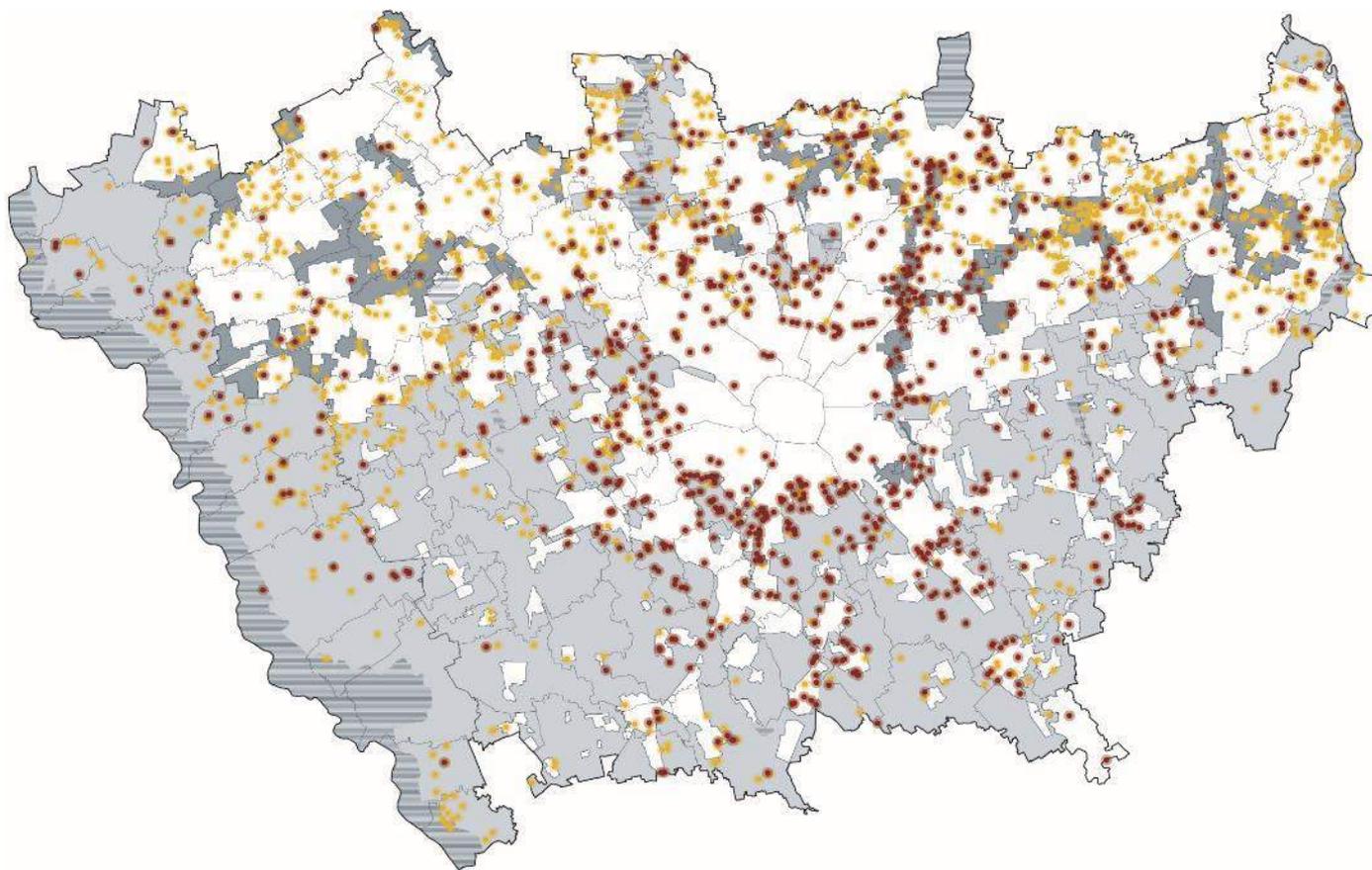
8.540.485 mq

Overall surface

1.723.607 mq

Overall surface within urban area

Parks and urban gardens



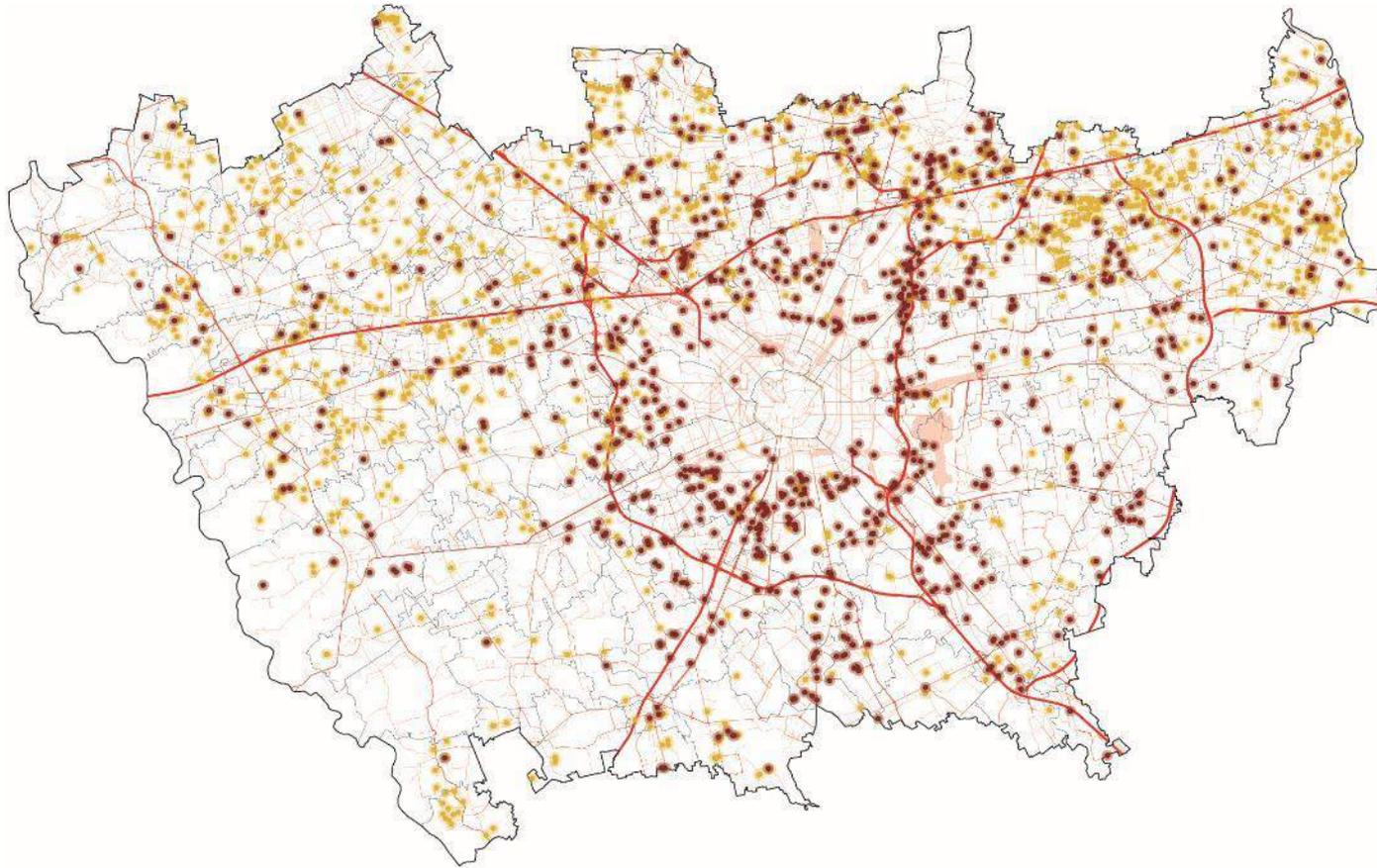
36% delle colonie di orti è incluso
in **PARCHI REGIONALI**, pari a **1.035.625**
mq su **2.681.847** mq

6,8% delle colonie di orti è incluso
in **PLIS**, pari a **182.047** mq su
2.681.847 mq

43,4% delle colonie di recinti è
incluso in **PARCHI REGIONALI**, pari a
2.543.657 mq su **5.858.637** mq

16,6% delle colonie di recinti è
incluso in **PLIS**, pari a **971.908** mq su
5.858.637 mq

Road network



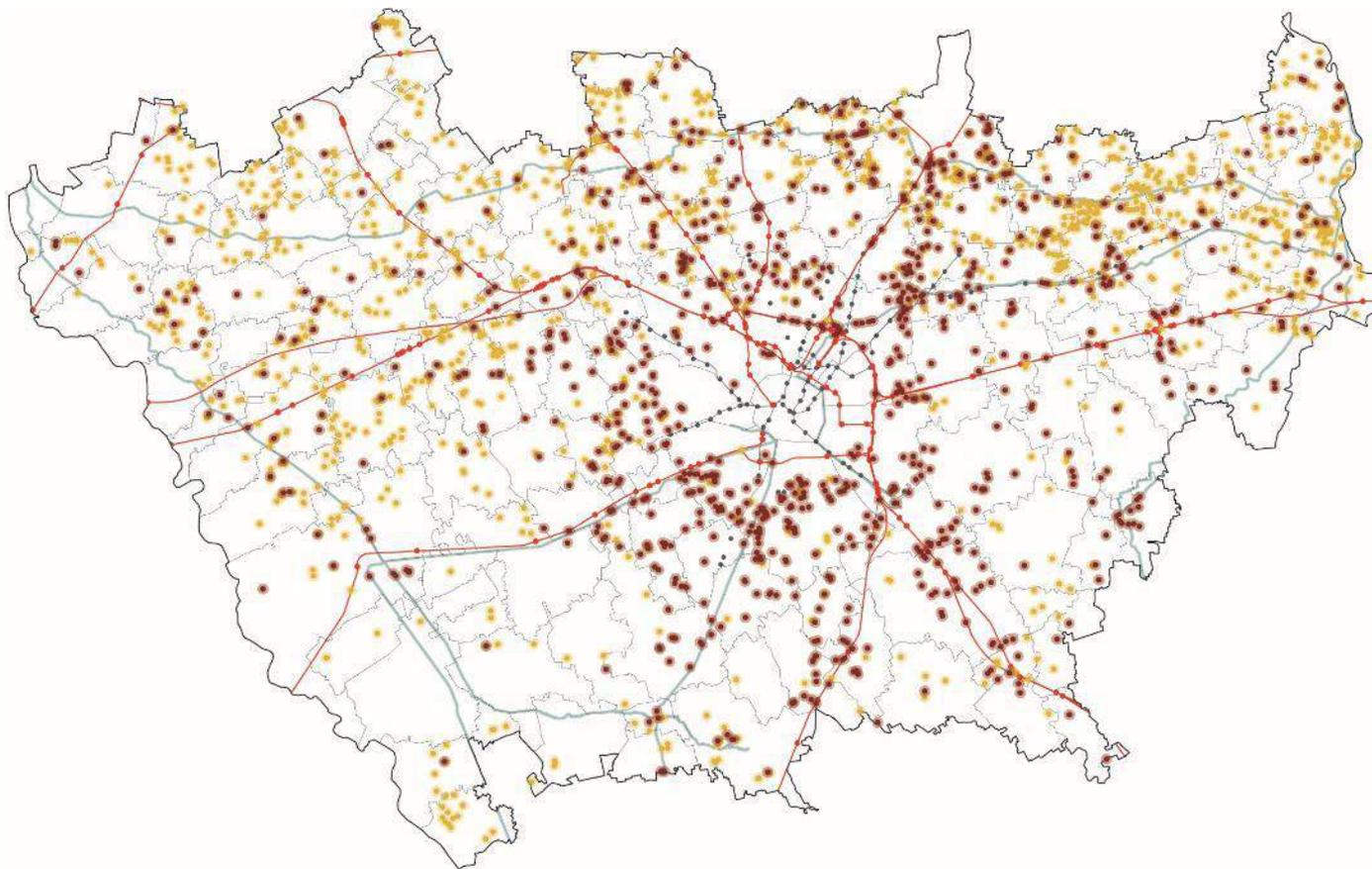
10% delle colonie di orti si trova a
meno di 100 metri dalla **RETE
INFRASTRUTTURALE PRINCIPALE**
(autostrade e tangenziali)

pari a
268.313 mq su **2.681.847 mq**

5,9% delle colonie di recinti si trova a
meno di 100 metri da **RETE
INFRASTRUTTURALE PRINCIPALE** (autostrade e
tangenziali)

pari a
348.258 mq su **5.858.637 mq**

Railway network



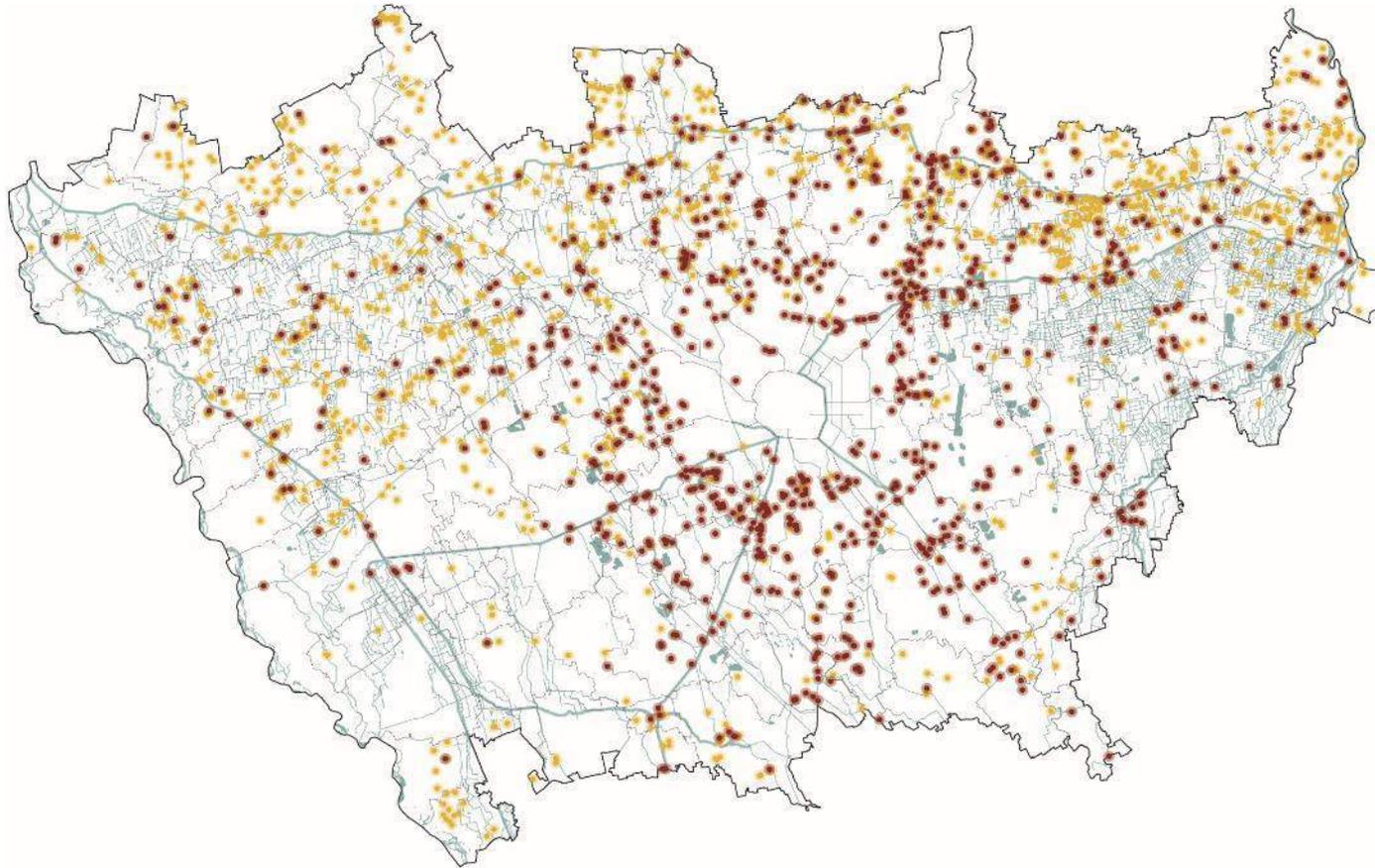
4,6% delle colonie di orti si trova a
meno di 100 metri dalla
RETE FERROVIARIA

pari a
122.676 mq su 2.681.847 mq

2% delle colonie di recinti si trova a
meno di 100 metri dalla
RETE FERROVIARIA

pari a
116.143 mq su 5.858.637 mq

Water network



10% delle colonie di orti si trova a meno di 500 metri dai **FIUMI PRINCIPALI**, pari a **269.454 mq su 2.681.847 mq**

20,1% a meno di 500 metri dai **CANALI ARTIFICIALI**, pari a **540.013 mq su 2.681.847 mq**

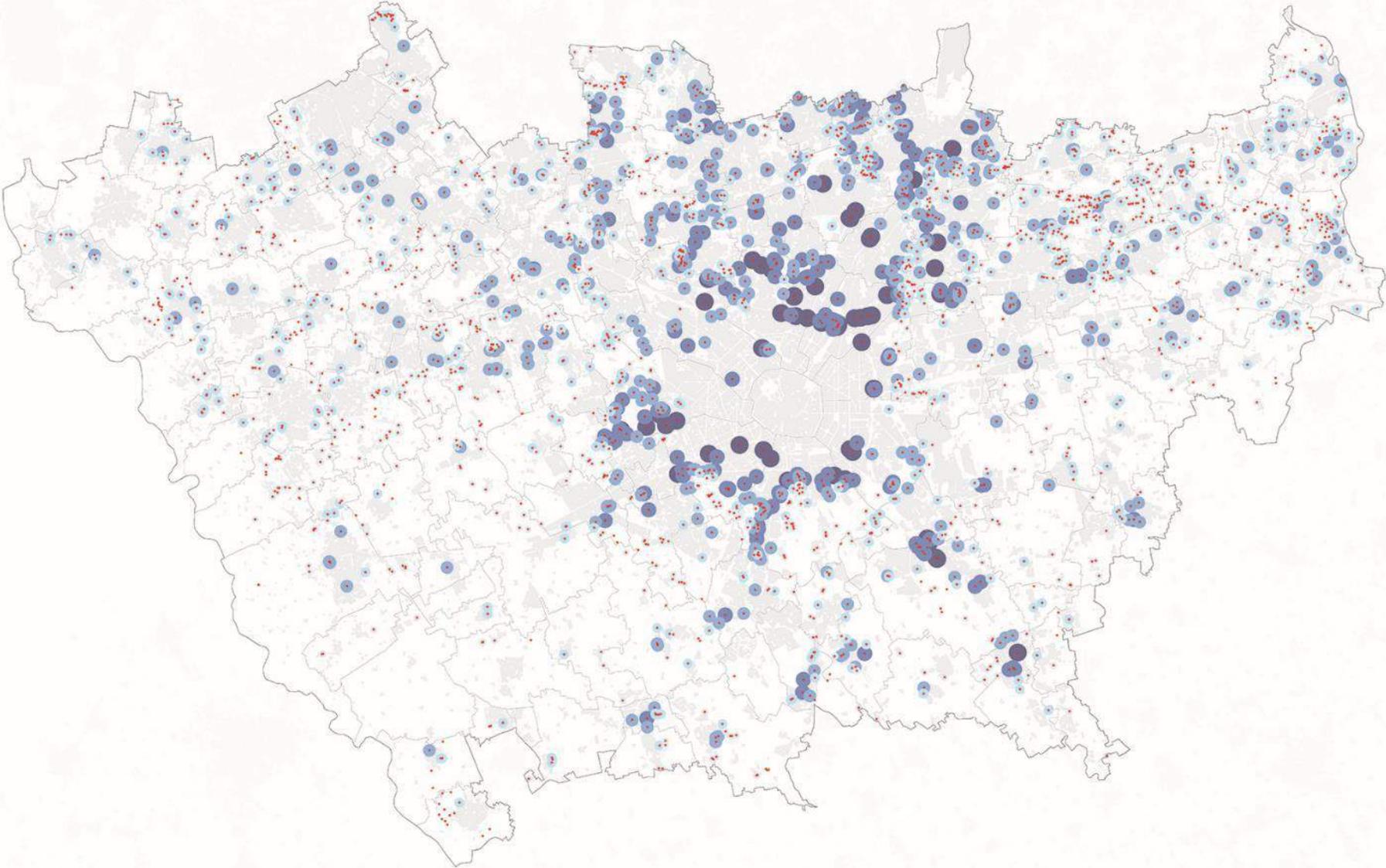
3,8% delle colonie di recinti si trova a meno di 500 metri dai **FIUMI PRINCIPALI**, pari a **225.386 mq su 5.858.637 mq**

16,7% a meno di 500 metri dai **CANALI ARTIFICIALI**, pari a **981.243 mq su 5.858.637 mq**

Agricultural system (SIARL – Sistema Informativo Agricoltura Regione Lombardia)



Inhabitants



Numero di residenti entro 500 metri da una colonia ortiva per sezioni di censimento ISTAT



Processes of urban regionalization in Italy: a focus on mobility practices explained through mobile phone data in the Milan urban region

Fabio Manfredini, Francesco Curci (DASU, Politecnico di Milano)

New «urban questions» and challenges

Exploring processes of urban regionalization in Italy

• **Processes of multi-scalar regional urbanization are occurring worldwide**, with characteristics that clearly distinguish them from processes studied by 19th and 20th century urban studies, through the traditional concepts of both the city, first, and the metropolis, later.



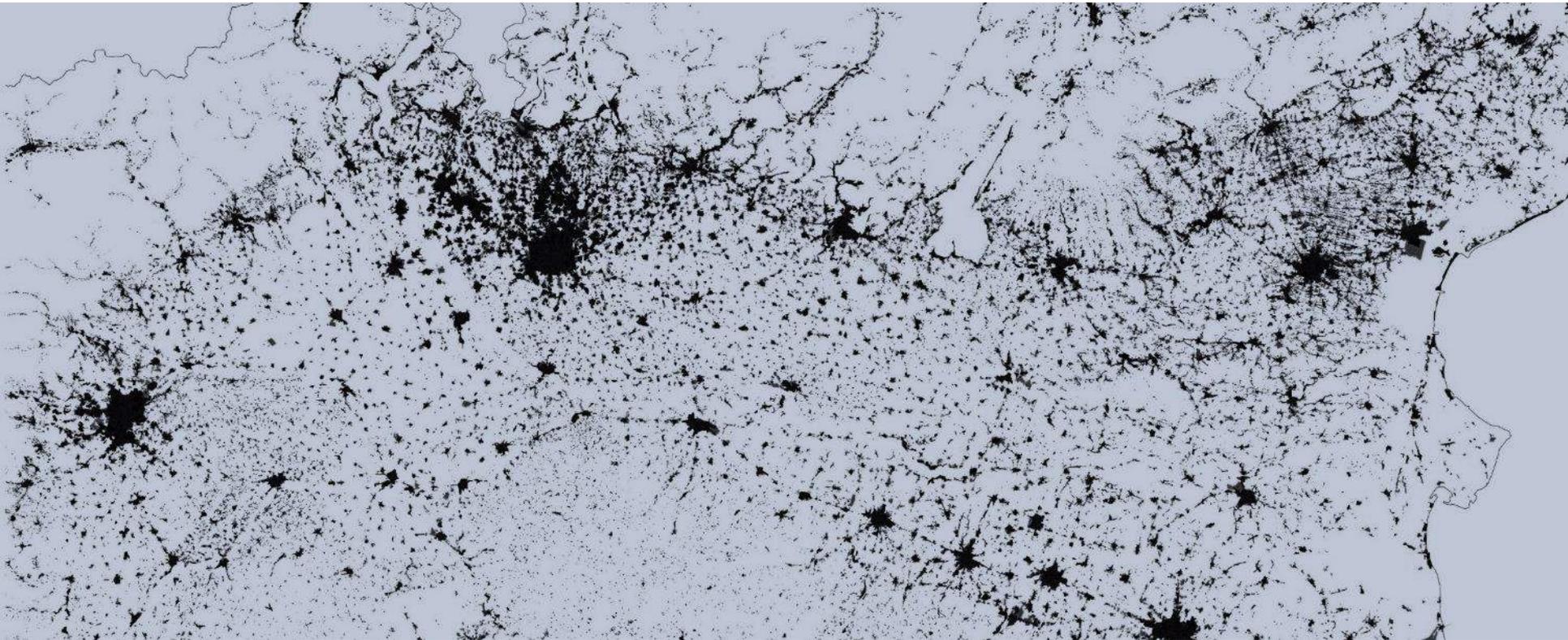
Satellite image of nighttime lights (from: Brenner, Neil. 2013. "Theses on Urbanization." *Public Culture* 25 (1). *Public Culture*: 87)

Image source: National Aeronautics and Space Administration (NASA)

New «urban questions» and challenges

Exploring processes of urban regionalization in Italy

- Assuming this perspective, that we could synthetically indicate with the concept of the "post-metropolis" (Soja, 2011), we are aiming at **exploring the new urban forms of contemporary Italy**, with a particular attention to the production of processes of regionalization of the urban (i.e. **regional urbanization**).



Urbanized areas in Northern Italy, 2011(image by PRIN Research Program "Post-metropolitan territories as emergent forms of urban space")

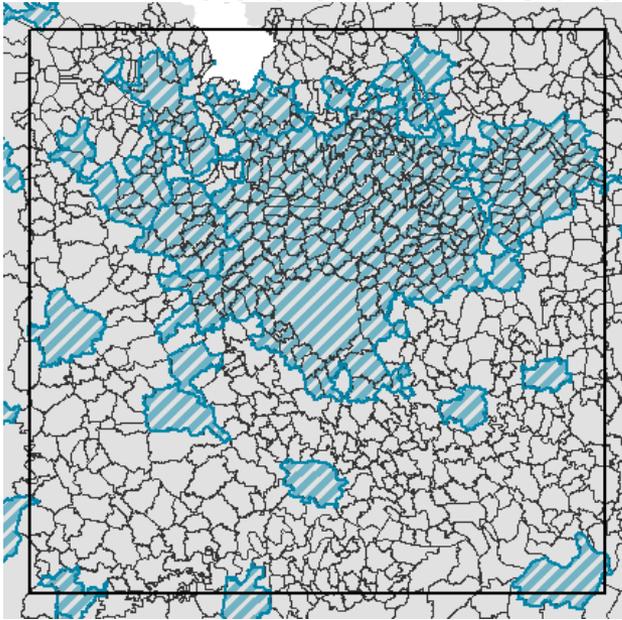
data source: ISTAT

The PRIN Research Project

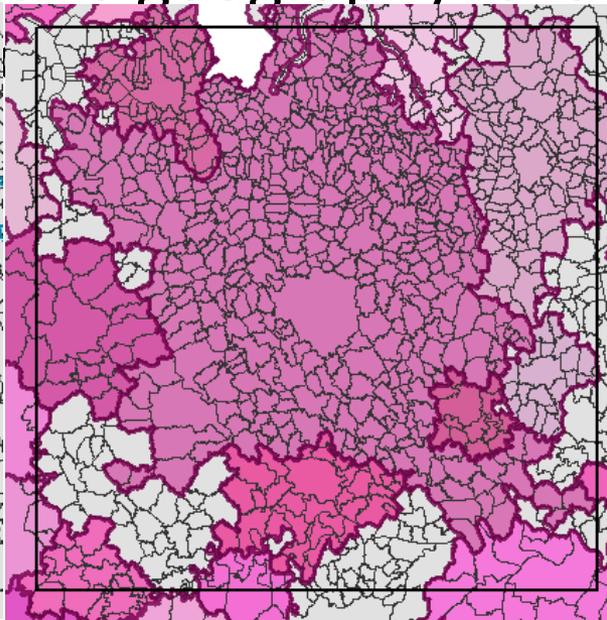
An atlas of post-metropolitan Italian cities

• **BEYOND BOUNDARIES**

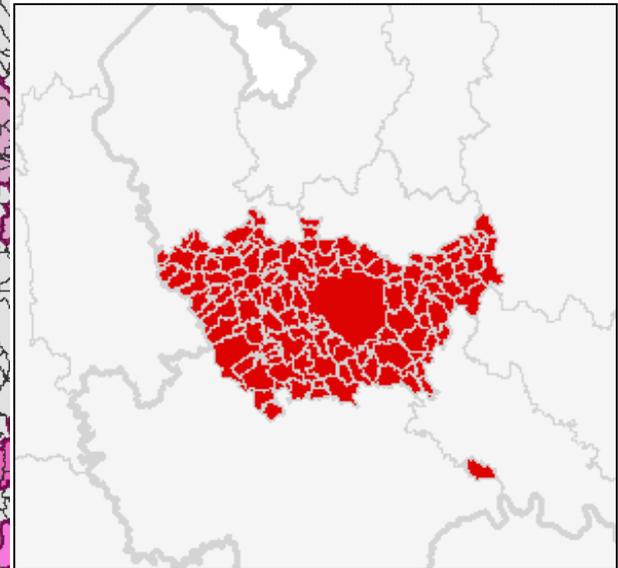
• ...but administrative geography fails to cope with



MORPHOLOGICAL URBAN AREAS



FUNCTIONAL URBAN AREAS



METROPOLITAN CITY

SOURCES: Istat + Database ESPON <http://database.espon.eu/db2/>

The PRIN Research Project

An atlas of post-metropolitan Italian cities

The scale and patterns of urban regionalization phenomena call for the **definition of analytical frames independent from administrative boundaries**

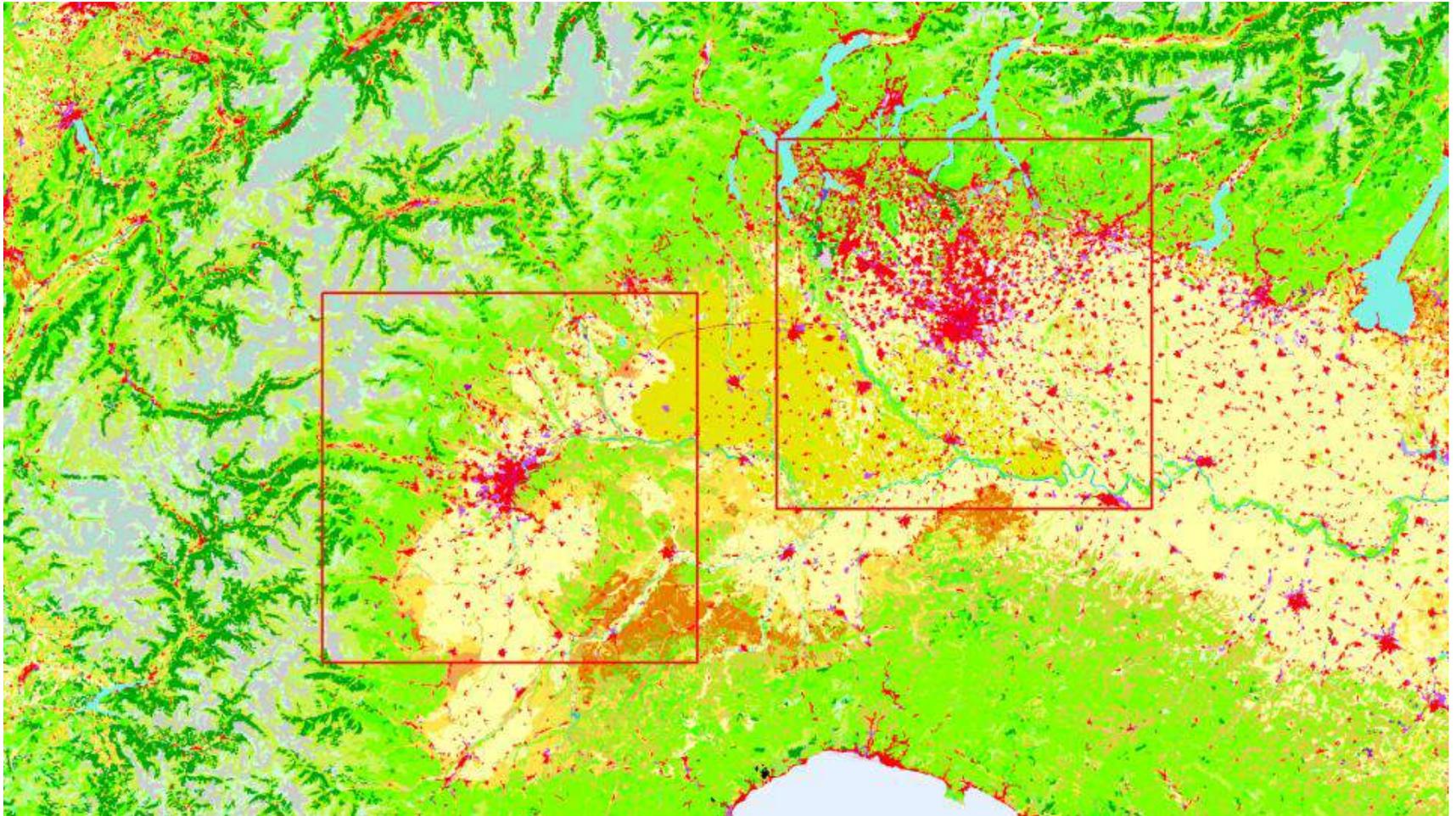
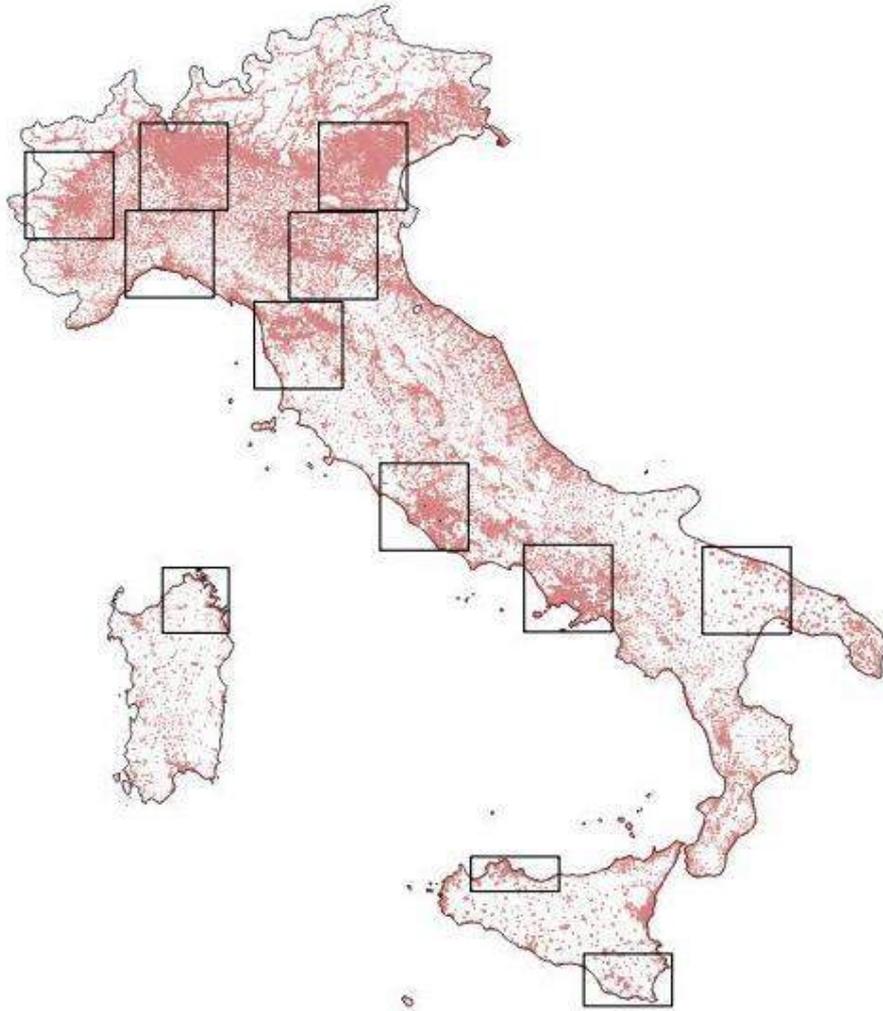


image by PRIN Research Program "Post-metropolitan territories as emergent forms of urban space"

The PRIN Research Project

An atlas of post-metropolitan Italian cities



- **12 SQUARES (9 + 3)**
- **100x100 km**
- Turin, Milan, Venice, Genua, Bologna, Florence, Rome, Naples, Bari
- **Less than 100x100 km**
- Palermo, South-eastern Sicily, Gallura

The PRIN Research Project

An atlas of post-metropolitan Italian cities

• **INTERACTIVE WEB SITE**

• www.postmetropoli.it

C - Morfologia e dinamiche socio-demografiche e abitative

- c.1 - Composizione demografica
- c.2 - Composizione familiare
- c.3 - Popolazione straniera
 - c.3.1 - Percentuale di popolazione straniera sulla popolazione totale - 1991, 2001, 2011
 - c.3.2 - Tasso di crescita medio della popolazione straniera - 2010-2013
 - c.3.3 - Tasso di variazione della popolazione straniera - 1991-2011
 - c.3.4 - Indice di dispersione della popolazione straniera - 1991, 2001, 2011
 - c.3.5 - Popolazione straniera in numero assoluto - 2013
- c.4 - Residenza e titolo di godimento delle abitazioni
 - c.4.1 - Percentuale di abitazioni occupate da persone residenti per titolo di godimento - 2001
 - c.4.2 - Percentuale di abitazioni occupate solo da persone non residenti sul totale delle abitazioni - 201
- c.5 - Dimensioni e affollamento delle abitazioni
- c.6 - Sregolazione in ambito immobiliare
 - c.6.1 - Beni immobili confiscati - 2013
 - c.6.2 - Immobili non dichiarati e accatastati - 2001
 - c.6.3 - Percentuale di immobili ad uso residenziale o produttivo non dichiarati e accatastati - 2011
- c.7 - Livelli di istruzione e occupazione
- c.8 - Offerta e composizione scolastica
 - c.8.1 - Quota di alunni a rischio abbandono delle scuole secondarie di primo e di secondo grado - 2012
 - c.8.2 - Quoziente di localizzazione C delle scuole per l'infanzia, primarie e secondarie di primo grado - 2012
 - c.8.3 - Scuole dell'infanzia e primarie per comune - 2012
- c.9 - Esclusione e rischio abitativo
 - c.9.1 - Altri tipi di alloggio - 1991, 2001, 2011
 - c.9.2 - Indice di esclusione abitativa - 1991, 2001, 2011
 - c.9.3 - Variazione dell'indice di esclusione abitativa - 1991-2001 e 2001-2011
 - c.9.4 - Indice di rischio abitativo - 2011

Legenda

Il valore minore è escluso mentre quello maggiore è incluso.

< 10000.00
10000.00 - 20000.00
20000.00 - 30000.00
30000.00 - 40000.00
40000.00 - 50000.00
50000.00 - 60000.00
60000.00 - 70000.00
70000.00 - 80000.00
80000.00 - 90000.00
90000.00 - 100000.00
100000.00 - 110000.00

Legenda

Numero di comuni residenti in ogni classe. In ogni classe il valore minore è escluso mentre quello maggiore è incluso.

< 10000.00
10000.00 - 20000.00
20000.00 - 30000.00
30000.00 - 40000.00
40000.00 - 50000.00
50000.00 - 60000.00
60000.00 - 70000.00
70000.00 - 80000.00
80000.00 - 90000.00
90000.00 - 100000.00
100000.00 - 110000.00

Varianza interna ai Tasselli PRIN

Confronto tra i valori della Varianza dell'indicatore all'interno dei singoli tasselli e nel resto d'Italia.

Torino	100
Milano	100
Venezia	100
Firenze	100
Roma	100
Napoli	100
Palermo	100
Sicilia Sud-Orientale	100
Calabria	100
Resto d'Italia	100

Distribuzione dei valori

Distribuzione della densità abitativa stimata per ogni di 1500 (sopra tra 7.5) e 4.000 (sopra tra 12000) e quelli con una densità maggiore di 80000 sono stati raggruppati in un'unica barra.

Valore comunale medio dell'indicatore nell'area geografica di riferimento selezionata: 73871.66

Varianza interna ai Tasselli PRIN

Confronto tra i valori della Varianza dell'indicatore all'interno dei singoli tasselli e nel resto d'Italia.

Torino	10
Milano	10
Venezia	10
Firenze	10
Roma	10
Napoli	10
Palermo	10
Sicilia Sud-Orientale	10
Calabria	10
Resto d'Italia	10

Distribuzione dei valori

Distribuzione della densità abitativa stimata per ogni di 1500 (sopra tra 7.5) e 4.000 (sopra tra 12000) e quelli con una densità maggiore di 80000 sono stati raggruppati in un'unica barra.

Valore comunale medio dell'indicatore nell'area geografica di riferimento selezionata: 73871.66

MENU/LIST OF INDICATORS

FULL/DEFAULT VISUALIZATION

CUSTOMIZED VISUALIZATION

The Milan urban region

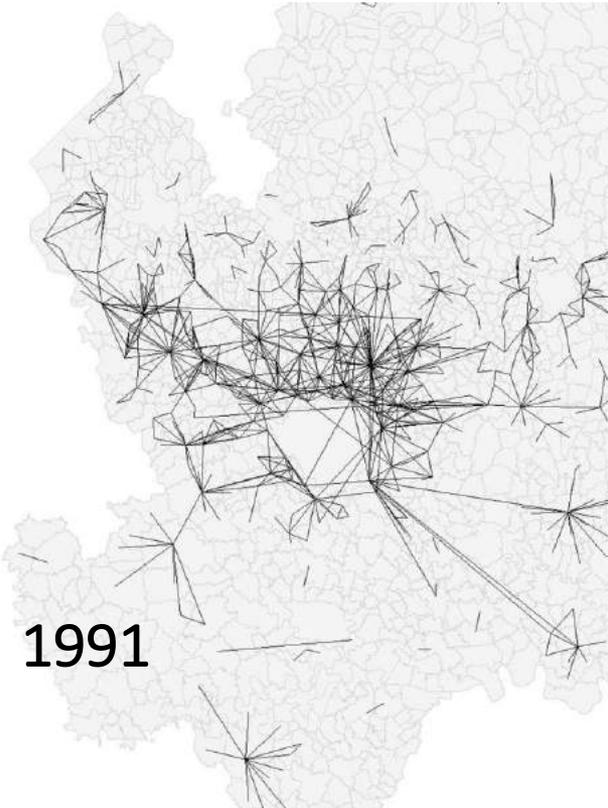
The ongoing explosion of urbanized areas

Land take dynamics show an ongoing 'isotropic' process of urbanization

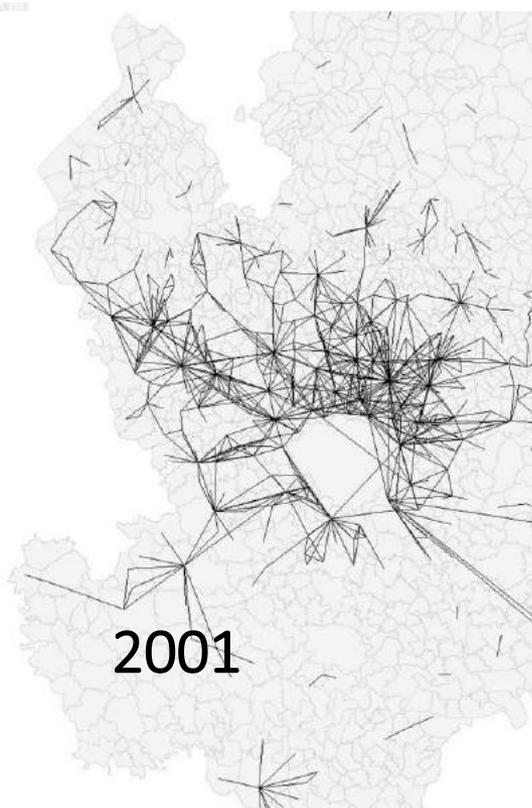


From arable land to construction sites - image by PRIN Research Program "Post-metropolitan territories as emergent forms of urban space"

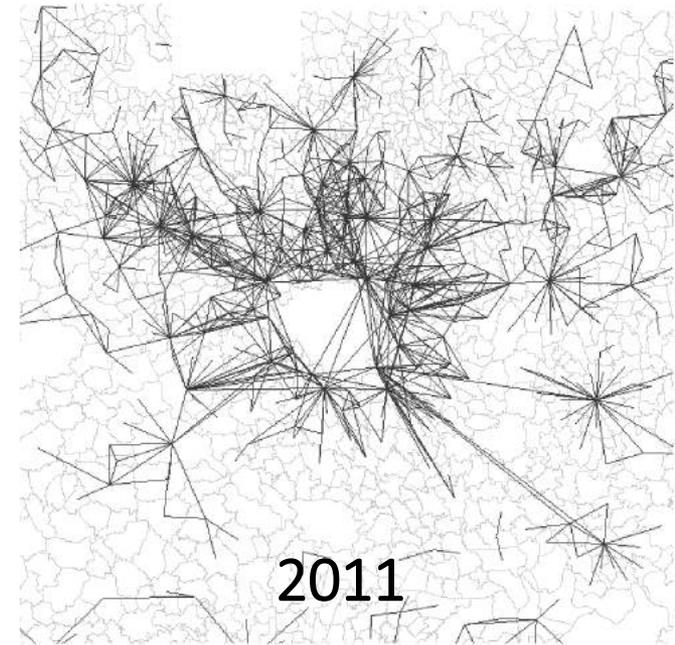
Exploring mobility practices



1991



2001



2011

Commuters fluxes > 100
(excluded fluxes for and from regional cities)
Source : Istat 1991 -2001-2011

Growing network of less hierarchical relationships inside dynamic places in the urban region

The Milan urban region

The flattening out of the density gradient

...but new functions are changing non work-related mobility

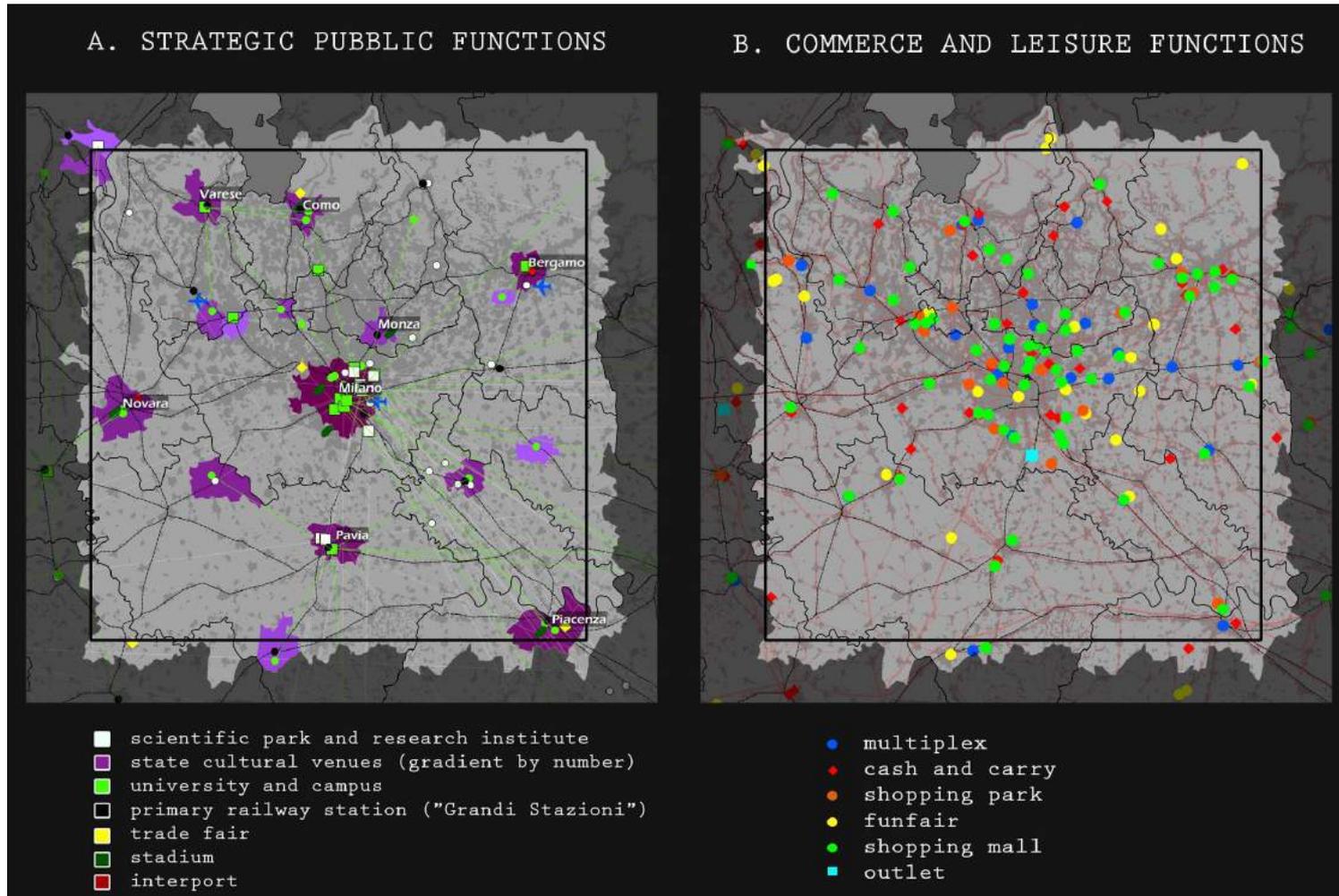
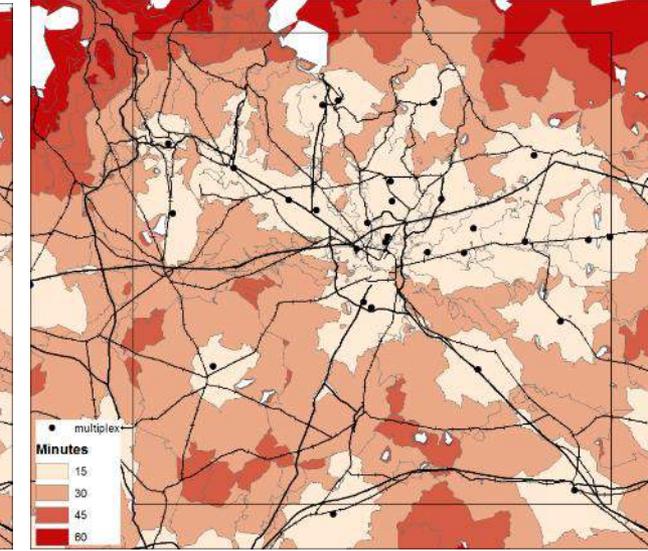
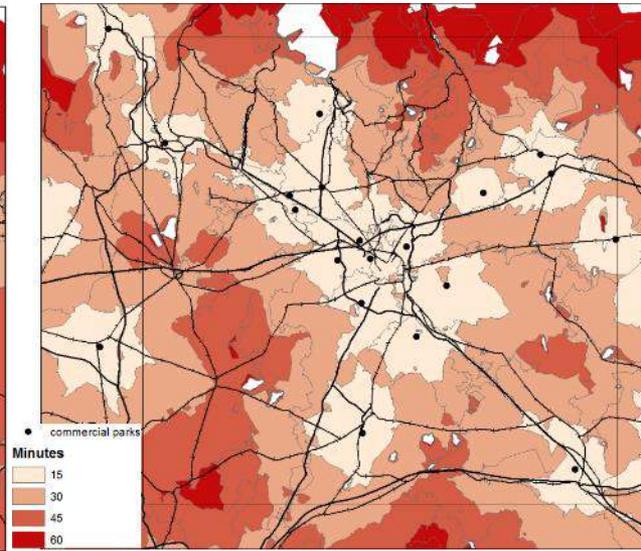
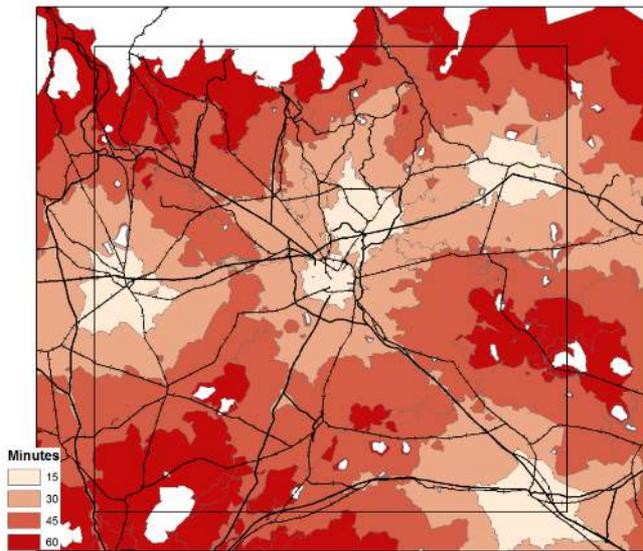


image by PRIN Research Program "Post-metropolitan territories as emergent forms of urban space"

The Milan urban region

Accessibility



Urban poles

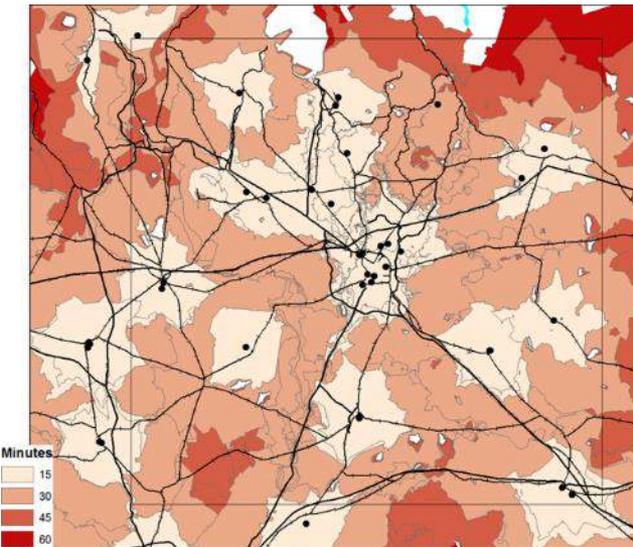
Commercial poles

Multiplex

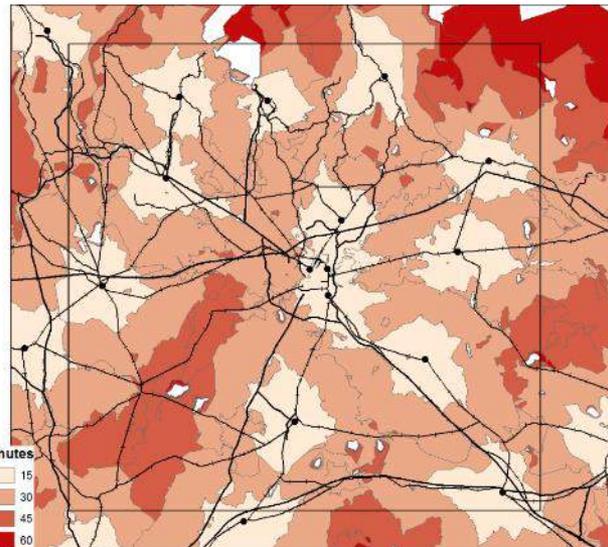
Road accessibility to different urban poles and facilities: Isochrone representation (15, 30, 45, 60 minutes)

The Milan urban region

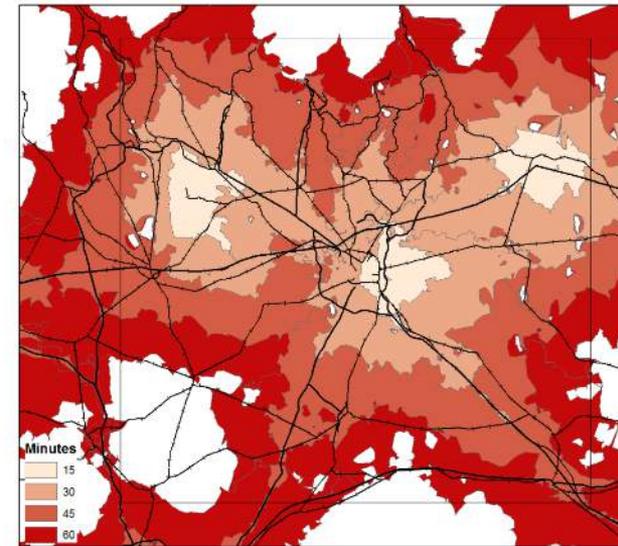
Accessibility



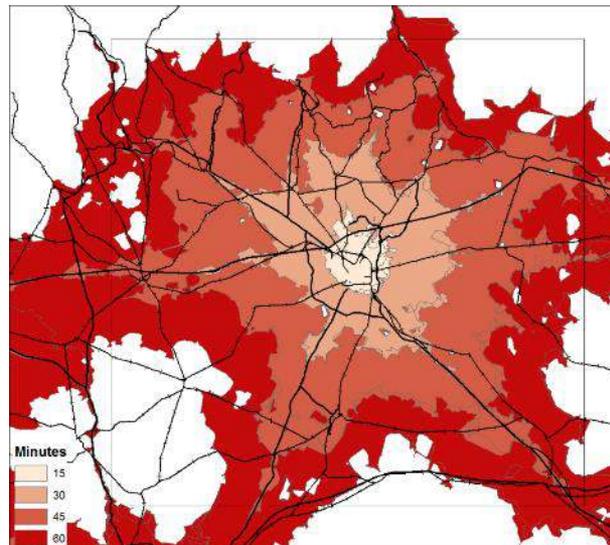
University



Railway stations



Airports



Milan city center

Exploring mobility practices through mobile phone data



Mobility practices are linked with the complexity of the socio-spatial fabric and the emergence of new multiple centralities.

New forms of mobility are emerging and have intensified the density and typologies of movements that traditional sources are unable to describe with continuity.

Exploring mobility practices

New sources vs conventional data

- Traditional data sources for urban investigations:
- pros
 - Socioeconomic and demographic information is public, open to wider users and referred to all the population
- ... and known limitations
 - high cost
 - low frequency
 - difficulty of updating
 - Time dimension is missing

New data sources can help in understanding mobility patterns, in describing and assessing urban changes and diversified uses of the city.

Exploring mobility practices

A new research field

In contemporary urban research debate, there is a growing interest in the study of the **behavior of people in urban spaces**, in the definition and in the analysis of **urban populations** and of **community practices** and how these reshape the boundaries of the city.

The main element of interest is how to qualify different places according to their use with a specific focus on **emerging spatial and temporal patterns** and how to acquire novel information on the different practices that happen in these places.

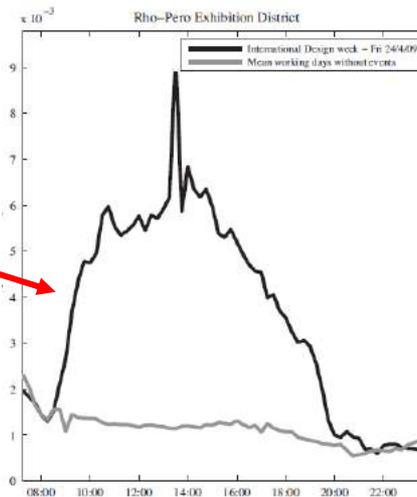
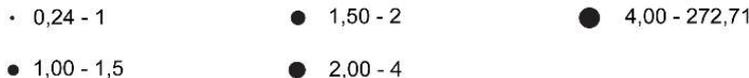
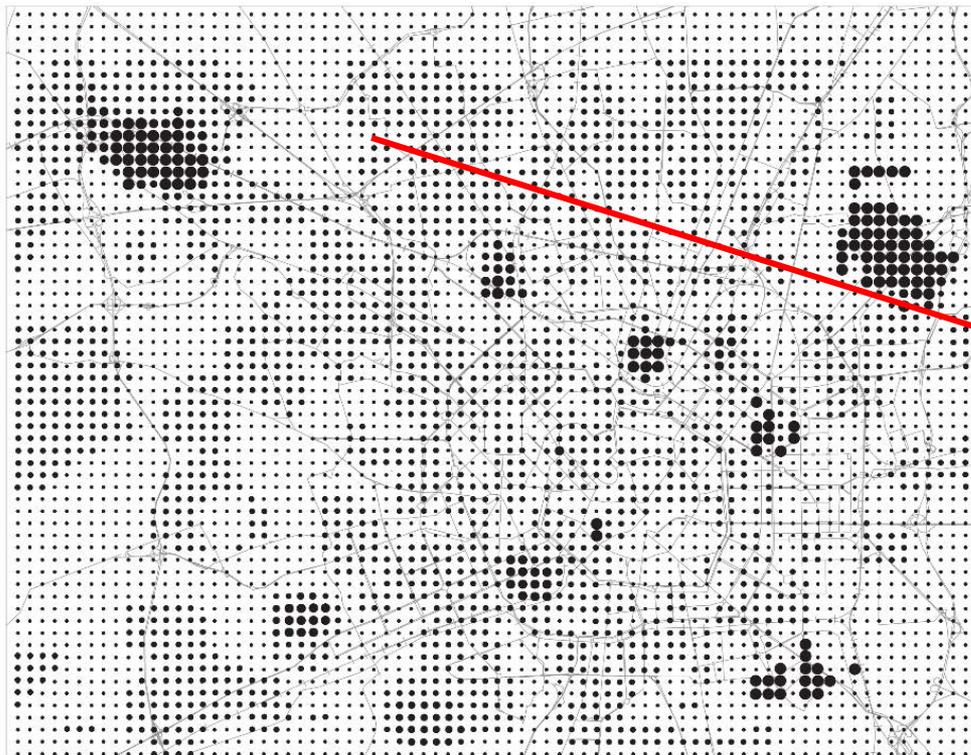
Mobile phone data

Erlang analysis – 2011 International Design Week

Micro scale analysis

II – Impact of a special event on the urban system

- Elaboration: map of the ratio between the activity of a whole day with events and a whole normal weekday (ratio of daily aggregated Erlang values)

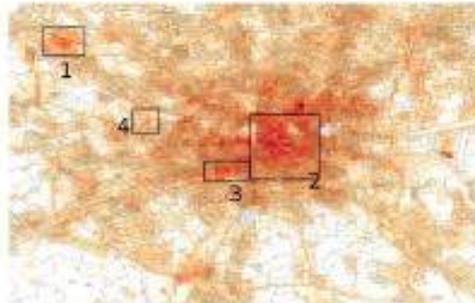


Variability of cell phone traffic (Erlang) at the Rho-Però Exhibition District during the 2009 International Design Week (black) and in a typical weekday, without events (gray).

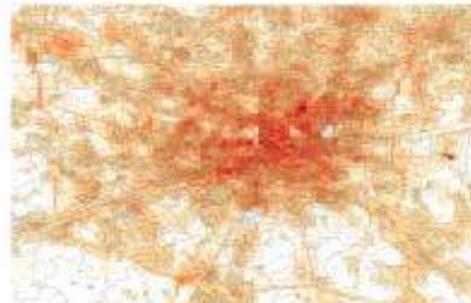
Mobile phone data

Erlang analysis – 2011 International Design Week

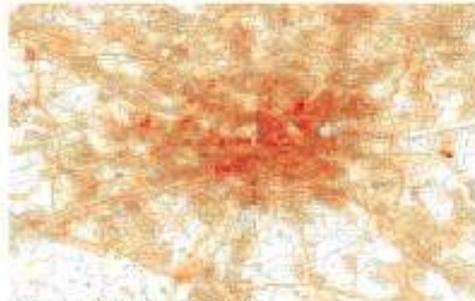
cell phone traffic on 16 April 2010 from h. 17 to h. 23.



h. 17-18, April 16, 2010



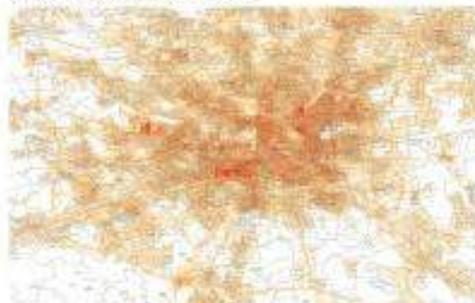
h. 18-19, April 16 2010



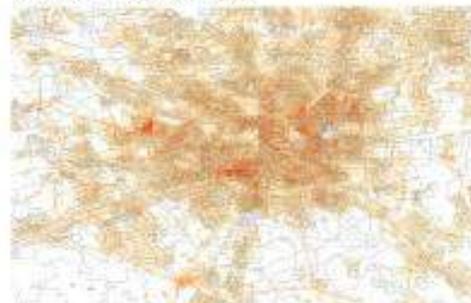
h. 19-20, April 16 2010



h. 20-21, April 16 2010



h. 21-22, April 16 2010



h. 22-23, April 16 2010

Increasing intensity of red color corresponds to higher cell phone traffic.

It is possible to observe the parts of the city where phone activity is high, largely due to the International Design Week activities. Numbered boxes highlight areas of particular interest:

1 = Exhibition District; 2 = Milan city centre; 3 = Tortona District; 4 = San Siro Stadium.

Mobile phone data

The treelets decomposition methodology

Aim: identification of useful information on hidden patterns of mobile phone use.

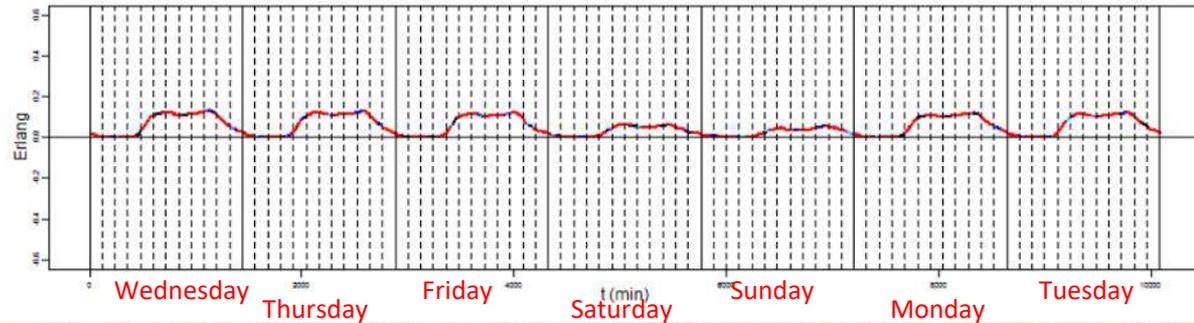
These hidden patterns regard different usages of the city in time and in space which are related to individual mobility, outlining the potential of this technology for the urban planning community.

The methodology allows to obtain **a reference basis** that reports the specific effect of some activities on the Erlang data recorded and **a set of maps** showing the contribution of each activity to the local Erlang signal.

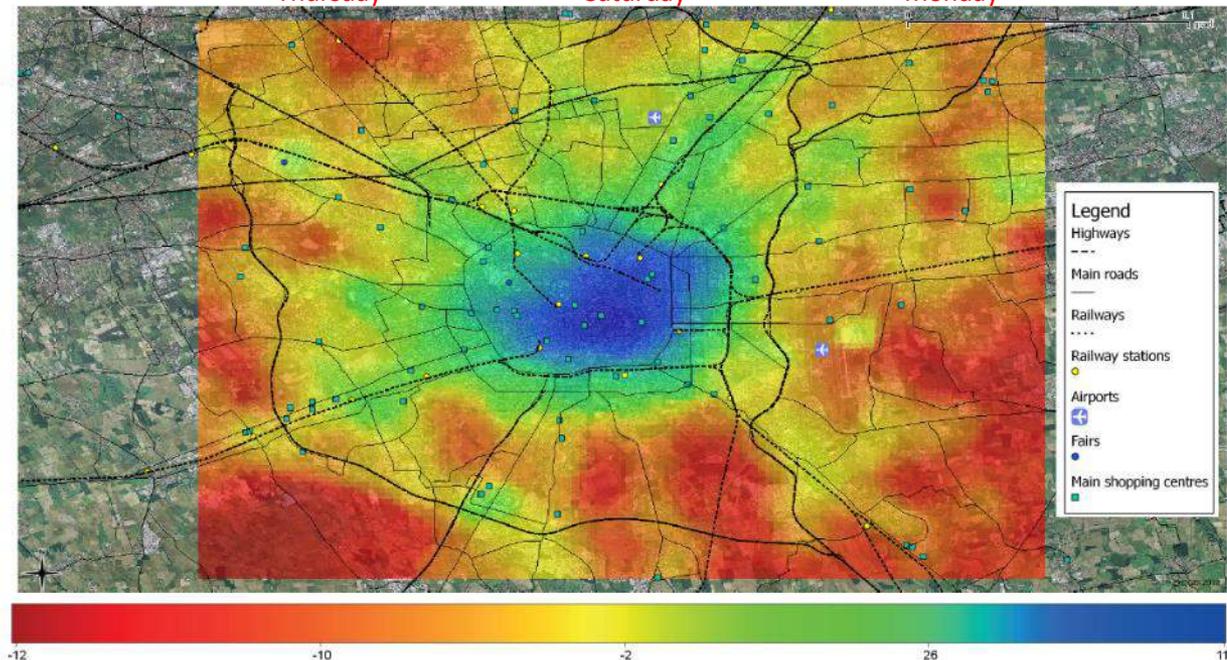
We selected some results as significant for explaining specific mobility and city usages patterns (commuting, nightly activities, distribution of residences, non systematic mobility) and tested their significance and their interpretation from an urban analysis and planning perspective at the Milan urban region scale.

Mobile phone data

The «average use»



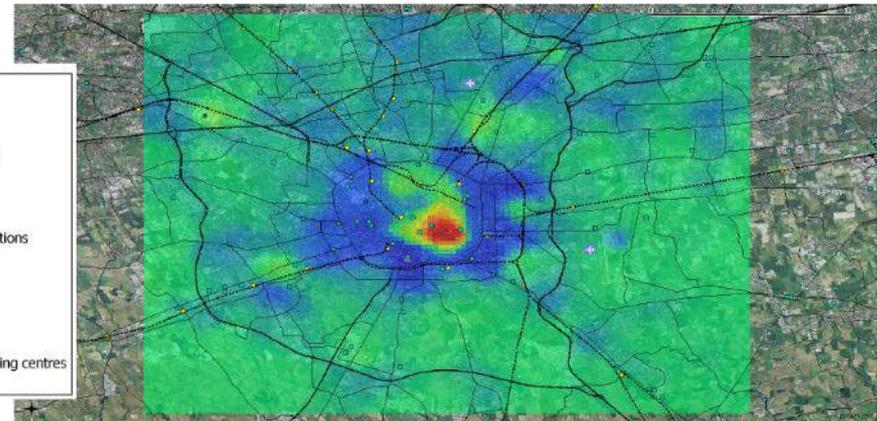
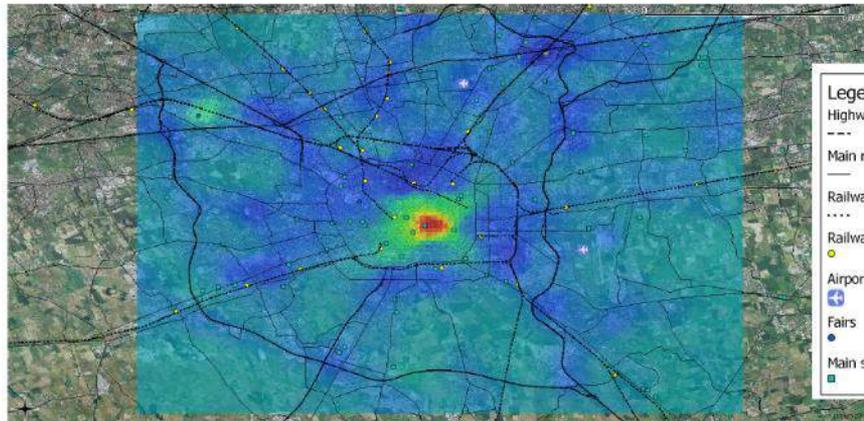
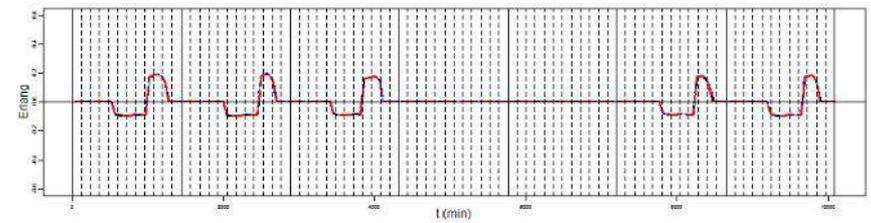
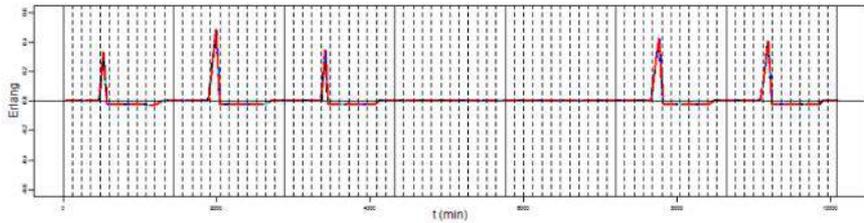
Reference
Basis



Map

Treelet 1 – The “average use” treelet map. The treelet contains different temporal patterns of mobile phone activity (i.e. daily, working day versus week end) that fit with actual city usage.

Mobile phone data Mobility practices



- Legend
- Highways
- Main roads
- Railways
- Railway stations
- Airports
- Fairs
- Main shopping centres



Treelet 82 (left) and 83 (right) - **Mobility practices**. Weekdays commuting flows at the Milan urban region scale: morning rush hours (left) vs to evening rush hours (right).