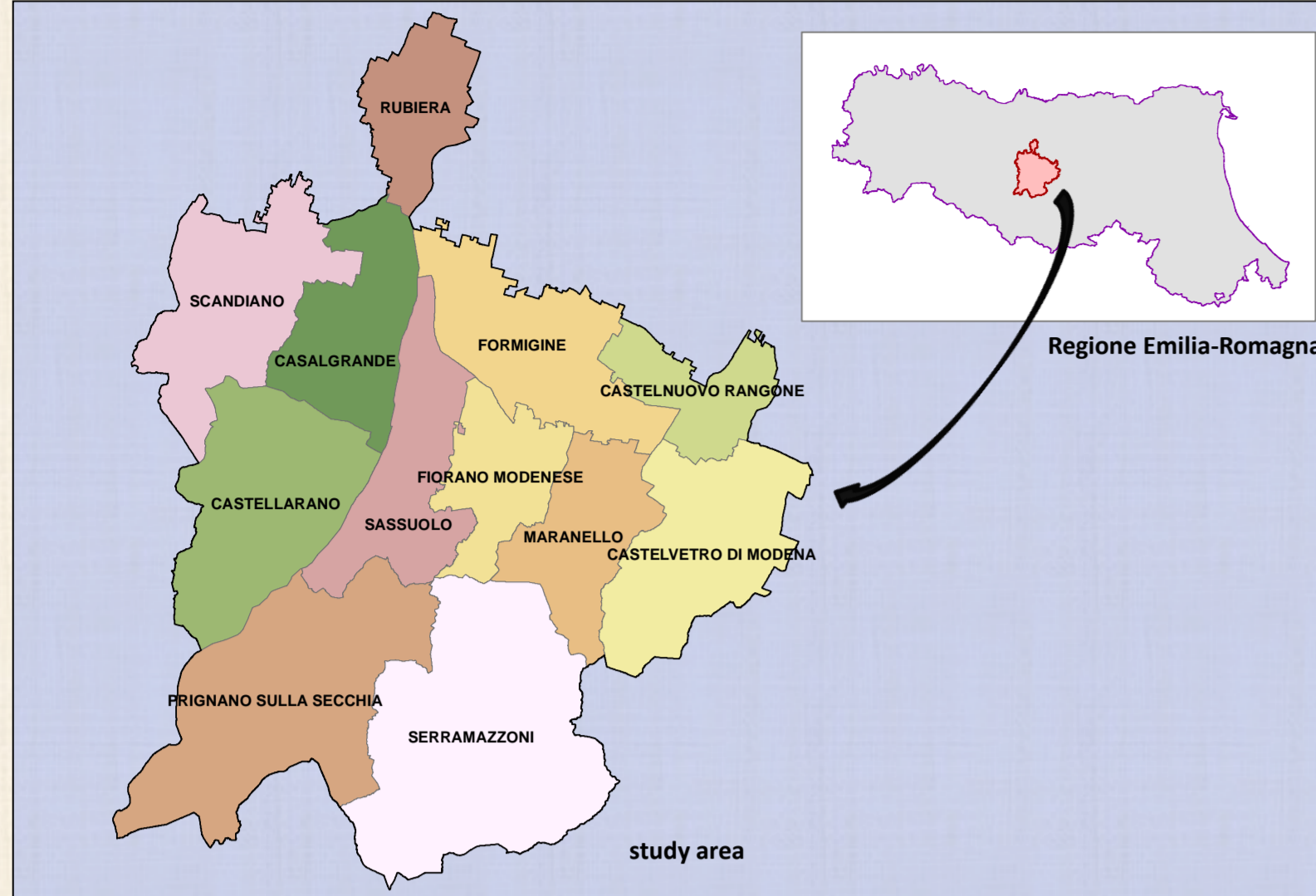


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The case study of the industrial Ceramics District: an integrated analysis of land use changes



Study area

The study area was chosen because of its deeply-rooted industrial production vocation, which has remained unchanged over several years despite cyclical economic downturns.

It includes the Municipalities of Casalgrande, Castellarano, Castelnuovo Rangone, Castelvetro of Modena, Fiorano Modenese, Formigine Maranello, Rubiera, Sassuolo, Scandiano, Serramazzoni and Prignano sulla Secchia: except for the last two, these Municipalities are all part of the so called "Sassuolo-Scandiano ceramic district".

Objectives

- acquire a deeper knowledge of the area and its history concerning land use changes
- provide useful tools to assess the effects of that history on environmental, landscape and socio-economic components of the study area



Photo Ageo 2011



Land use map 2008

Industrial districts and urban areas Stopping the growth?

Land use analysis

The analysis consisted in comparing the "1954", "1976", "2003" and "2008" land use maps produced by the Emilia-Romagna Regional Authority.

Since they are characterized by different captions and minimum areas, a common caption was first of all defined related to all maps; then, maps with smaller areas were generalized to make them comparable with the less detailed ones.

Land use changes were analyzed with a specific focus on the caption "items" related to manufacturing activities and built urban areas.

Furthermore, land use evolution was separately studied in lowland areas and in hills.

Land Use LEGEND		
Artificial surfaces	Urban fabric	11
	Industrial or commercial units	12
	Transport units	13
	Mine, dump and construction sites	14
	Artificial, non-agricultural vegetated areas	15
Agricultural areas	Arable land	21
	Arable land planted with trees	22
	Permanent crops	23
	Pastures	24
Forest and seminatural areas	Heterogeneous agricultural areas	25
	Forests	31
	Scrub and/or herbaceous vegetation associations	32
Wetlands	Open spaces with little or no vegetation	33
	Inland wetlands	41
	Maritime wetlands	42
Water bodies	Water courses	51
	Water bodies	52

Soil contamination

How much soil does it consume?



2008

SIN analysis

Under the project "Feasibility study for the remediation of surface aquifer in the ceramic district of Modena and Reggio Emilia" (Resolution 1838/2007), SIN areas (Sites of National Interest) were defined, according to the definition provided by the Ministerial Decree DM 26/02/03. This further analysis focused on those areas.

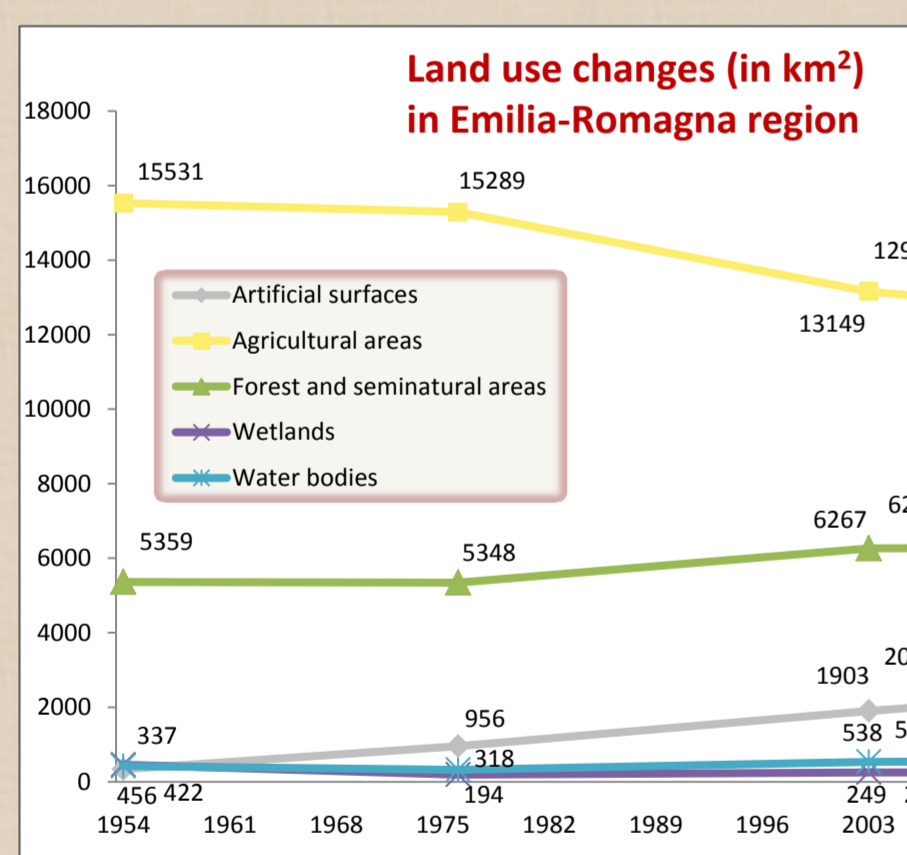
A specific land use caption was used, including 5 items (buildings, storage areas or squares, parking areas, areas for agricultural use, areas devoted to other) and an interpretation of images related to 1974-78, 1998, 2003 and 2008 periods was provided.

Class	Nomenclature
11	Buildings
12	Storage areas
13	Parkings
20	Agricultural areas
30	Other areas

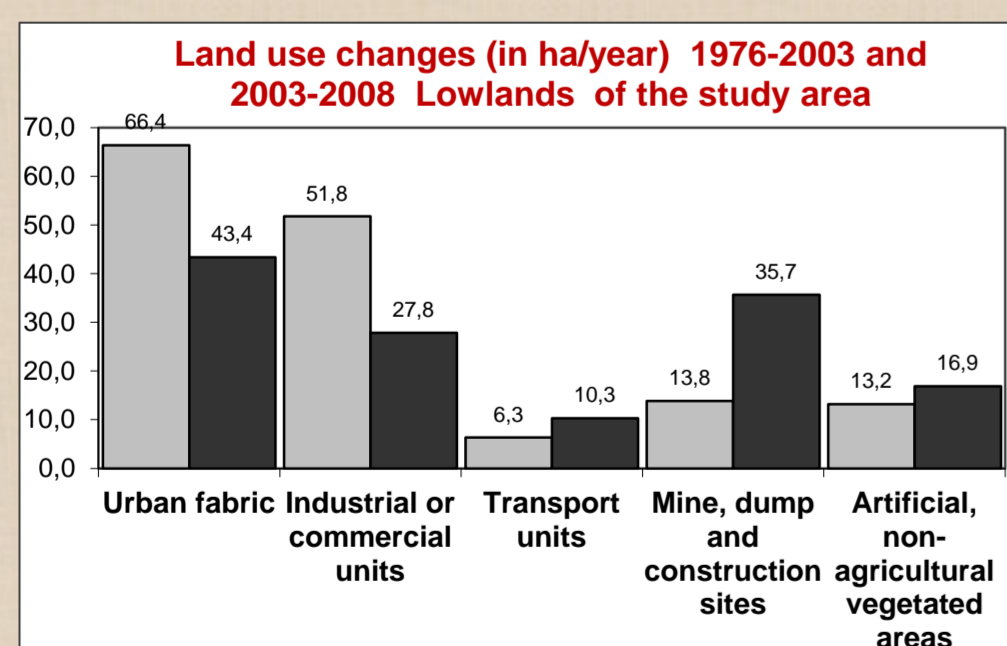
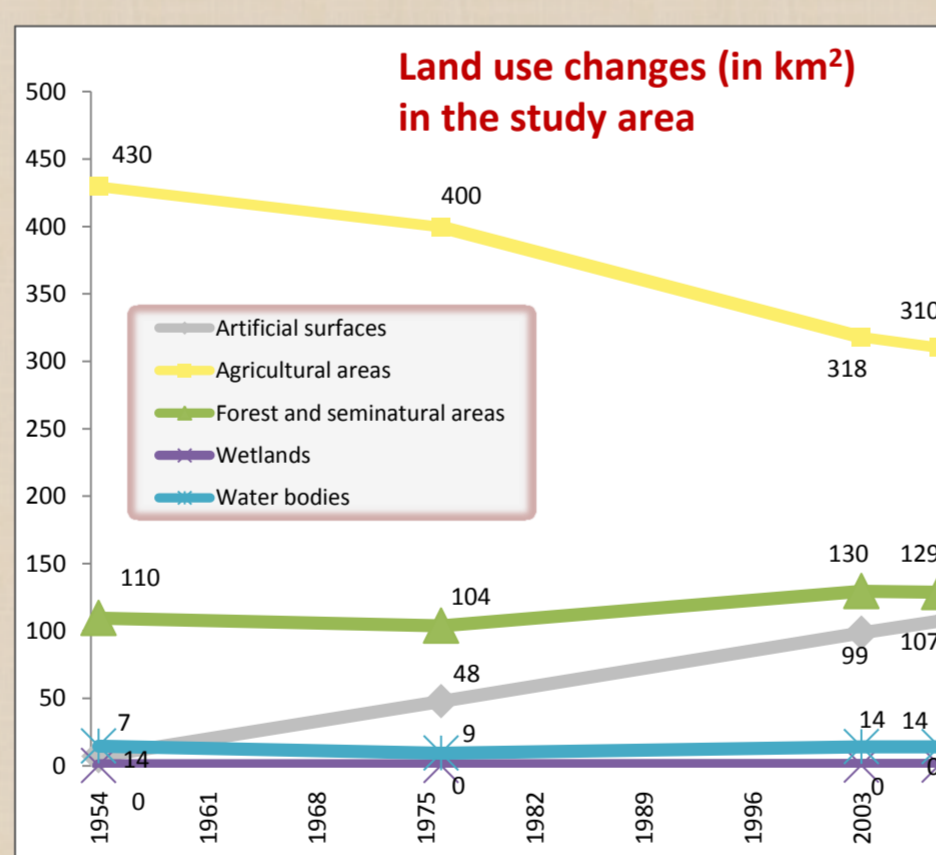
Soil reclamation

Reducing soil consumption

Some results of Land Use Analysis

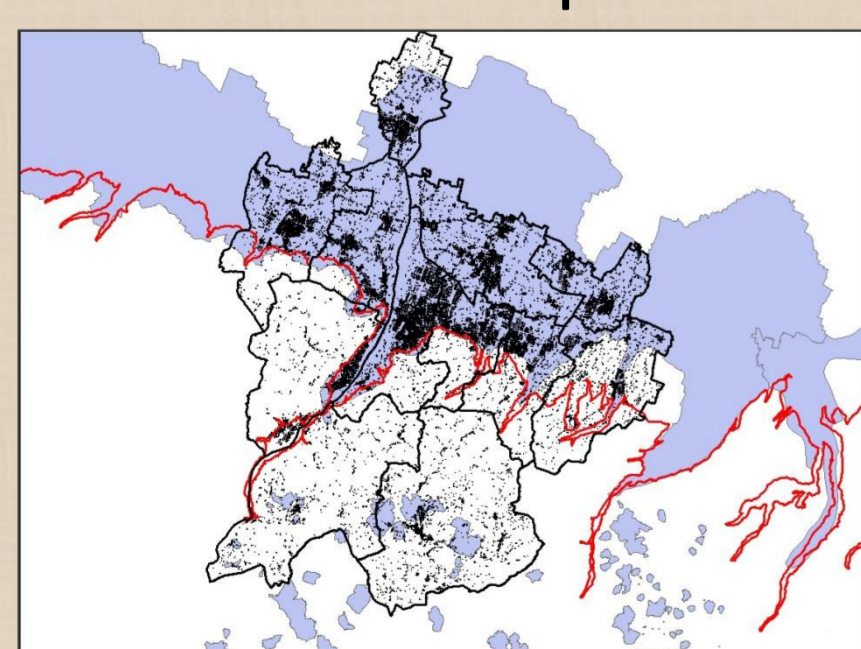


The different trends between the regional territory and the study area is principally due to the industrial vocation of that area. Artificial surfaces grew to the detriment of agricultural areas.



Urban areas, industrial and commercial units are still growing but at a rate lesser than in the past. On the contrary, transport units, mine, dump and construction sites grow faster, in the last period. All those artificial surfaces are located mostly in the lowlands.

In particular, they are concentrated in some areas that are very vulnerable from an environmental point of view.



Violet = vulnerable zones (for aquifers)
Red = limit of the plain
Black = buildings and area of study (2008)

Important areas of refilling of aquifers, at the base of the Apennines, characterized by a high risk of groundwater contamination.

Area (ha)	% in DV	Category
5262,55	76%	Urban fabric
3141,5	89%	Industrial or commercial units
222,76	92%	Transport units
1138,55	62%	Mine, dump and construction sites
914,28	80%	Artificial, non-agricultural vegetated areas
25530,88	42%	Arable land
0	0%	Arable land planted with trees
4094,54	59%	Permanent crops
750,25	13%	Pastures
621,62	8%	Heterogeneous agricultural areas
7706,99	10%	Forests
3534,91	7%	Scrub and/or herbaceous vegetation associations
1632,28	0%	Open spaces with little or no vegetation
30,28	100%	Inland wetlands
0	0%	Maritime wetlands
1291,17	63%	Water courses
104,85	61%	Water bodies

Some results of SIN Analysis

Land use (1 level)	Area (ha)			
	1976	1994	2003	2008
Artificial surfaces	34,3	36,3	40,6	41,8
Agricultural areas	13,8	15,0	10,1	8,9
Forest and seminatural areas	4,7	1,8		
Wetlands				
Water bodies	0,4	0,0	2,4	2,4

This table shows the land uses relieved in the SIN areas by the Regional Land use maps of 1976, 1994, 2003 and 2008.

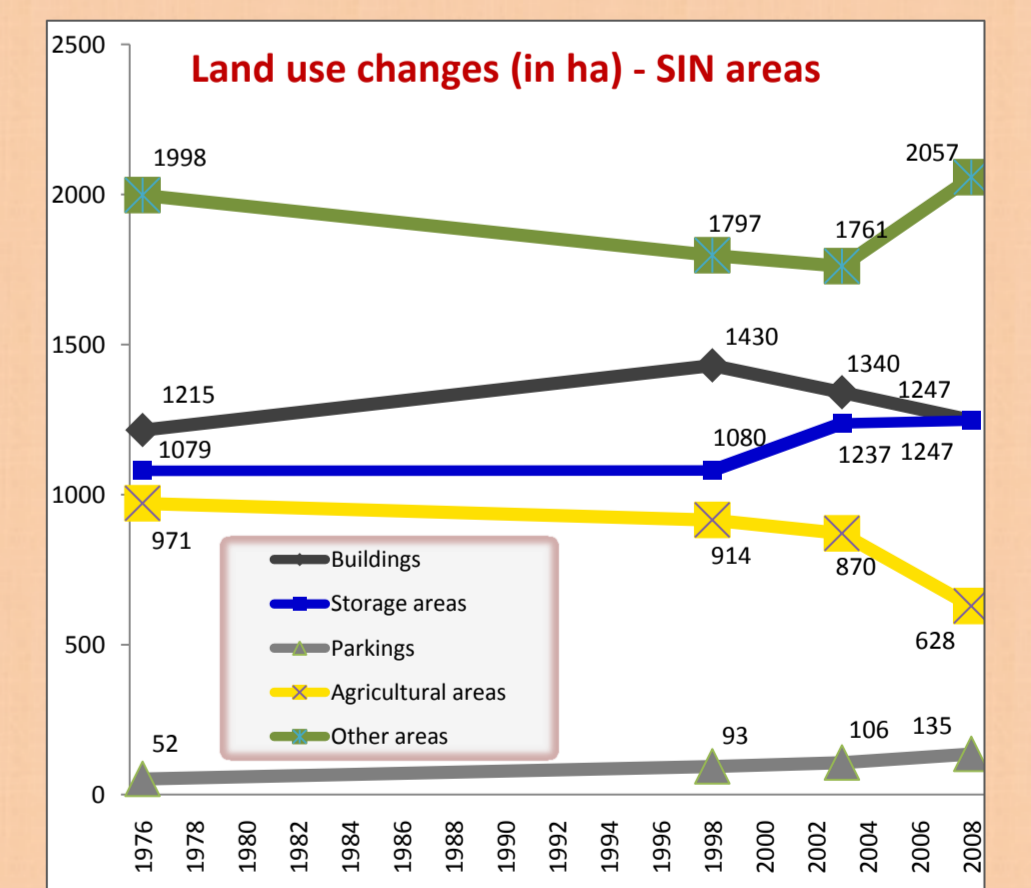
A significative percentage of no-sealed land use items (agricultural and seminatural areas, inland waters) are included: from 20% to 35 %.

Land use maps don't reveal soil consumption due to contamination but they can show the land use history of contaminated areas. It's important to underline that different land uses consume soil in different ways: consider, i.e., the different off site transfers of pollution between industrial and urban areas.

The focus on SIN points out that urban regeneration percentage, i.e. land reuse for manufacturing or residential purposes, is rather low (<20%) and it is mainly concentrated in the period between '76 and 2003, whereas it actually suffered a setback in the following period.

Area %	1976	1998	2003	2008
Buildings	23,9	26,9	25,2	23,5
Storage areas & Parkings -grouped-	21,3	22,1	25,3	26,0
Agricultural & Other areas -grouped-	55,8	51,0	49,5	50,5

Furthermore it shows that land use changes in areas affected by contamination mainly occurred in areas adjacent to actual production activities (parking & storage).



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