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e-agorà | e-αγορά

for the transition toward resilient communities

edited by G. Colombo | P. Lombardi | G. Mondini

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e-agorà/e-ἀγορά for the transition toward resilient communities

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A Reflection on Smart Governance in the new Metropolitan City of Cagliari

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Keywords: smart governance, smart territory, georesources planning, strategic planning, metropolitan cities.

Introduction

Italy's recent adoption of Law 56/2014 (known as the Delrio law) launched an ambitious organizational and institutional adaptation of metropolitan cities. This law is framed in the draft constitutional reform of the important and strategic-operational issues related to more extensive place-based functions (such as protection and enhancement of the environment, planning transport services, and the construction and management of roads). It is also intended to simplify the State-Regions skills system, from a hyper-structured model (regions and provinces), to one that is more sustainable, both financially and functionally (Gulli, 2011; Longo & Cicirello, 2016). In Sardinia, the Regional law 2/2016 "Reform of the system of local autonomy of Sardinia" (from the Italian *Riordino del sistema delle autonomie locali della Sardegna*) establishes the Metropolitan City of Cagliari with seventeen municipalities—with Cagliari as leader. The other municipalities are Assemini, Capoterra, Elmas, Decimomannu, Maracalagonis, Monserrato, Pula, Quartu, Quartucciu, Sarroch, Selargius, Sestu, Settimo, Sinnai, Villa San Pietro, and Uta. They include about 431,000 inhabitants, in an area of 1,250 square kilometres (ISTAT, 2015). Different urban planning tools—from those that are strategic to urban master plans or sector plans—continue to be used at various levels.

An analysis of these urban planning tools reveals that only weak attention has been given to the environmental aspect of georesources, and this is particularly true of the treatment given to aggregates in Metropolitan City of Cagliari. A territory requires aggregates mainly for private building activities and public works. The construction industry is the largest user of aggregates, according to a report that analysed territories' demands for aggregates after the Second World War (Balletto, 2005). This paper, after framing the Metropolitan City of Cagliari, evaluates environmental aspects of the quantification-procurement of construction materials such as aggregates that are essential for development and urban renewal. Doing so allows the authors to interpret key aspects of the smart region paradigm. In other words, the focus of this paper is on understanding whether the activities of development and urban regeneration are consistent with a that encompasses the smart cities concept, but also fit into the smart region paradigm.

The Context of the Metropolitan City of Cagliari

All seventeen municipalities, with the exception of Uta, have a municipal strategic plan (MSP). Only two (Assemini and Sestu) have Urban Masterplans (UPM) adapted to the Regional Landscape Plan (RLP) of 2006; the remaining municipalities have a previous-generation UPM. A detailed analysis of all urban planning tools, as mentioned in the previous section, has also highlighted the Metropolitan City of Cagliari's strategic functions and objectives, as they relate to its protection and territorial-environmental planning. They are synoptically represented in Table 1.

Tab. 1. Synopsis of the functions and objectives of the Metropolitan City of Cagliari

Functions	Tools and / or results
Spatial planning	The Territorial Outline Plan for Coordination (*Piano Territoriale di Coordinamento*) will contain not only the contents of the Provincial Urban Plan (*Piano Urbanistico Provinciale*), but also forecasts of border contexts among urbanized settlements, in order to ensure good coordination between the Urban Masterplans (UMPs) of the municipalities involved
	The Metropolitan Urban Masterplan (*Piano Urbanistico Metropolitano*) will contain the contents of the UMPs
	Multi-Year Implementation Programme (programma pluriennale di attuazione)
Protection and enhancement of cultural and environmental heritage	Ensures that tasks are related to the census, cataloging, documentation, recovering, conservation, and enhancement of the historical, monumental, archaeological, and environmental metropolitan goods
	Manages cultural facilities of high quality and importance, and major works and institutions aimed at protecting and enhancing the metropolitan ecosystem
	Verifying that the protection areas are identified in regional laws
	Plans measures needed to protect the land and water, and reduce air pollution
	Participates in the preparation and implementation of the Regional Plan of Civil Protection
Soil conservation, hydrogeological protection, protection and enhancement of water resources, waste disposal	Programming and management of (i) interventions for hydrogeological protection within the metropolitan city, and, (ii) tasks related to the enhancement of water resources
	Regulates and controls discharges of water, and regulates and exercises the collection and disposal of waste within the metropolitan city, including the implementation of related management systems
	Designs the construction and management of sewage wastewater at the metropolitan level
	Provides effective assistance by implementing the Regional Plan for the disposal of solid waste

Table 1 shows how the georesources planning that is closely linked to urban spatial planning is not explicit. A territory's demand for aggregates is primarily used for private building activities and public works, and the construction sector is the largest user of aggregates, according to a well-established report of direct proportionality in the second post-war (Druker et al., 1996). Nonetheless, local planning does not accommodate any variations attributable to georesources planning, either in terms of needs assessments in urban areas, or in relation to its ecological footprint. In fact, the important role of georesources in economic and environmental terms (Rapporto Cave, 2014; Krehbiel, 2016) requires high levels of attention when drafting and / or reviewing the UMP, and this is especially true in island areas, which is the region of Sardinia's context. Balletto, Mei, and Garau (2015) and Badino, Blengini, and Garbarino (2006) identify various approaches, from which we have chosen to adopt the needs assessment of aggregates, with reference to the provision of local planning tools for this study.

In the Metropolitan City of Cagliari, the hypothesis that soil consumption is equivalent to the demand for aggregates appears to be supported. In fact, the distance of Sardinia (region-island)

from the mainland exceeds sixty-five kilometres. For this reason, it can only rely on its own resources, because of the low market value of aggregates and the high transportation costs of moving things to and from the island (Wackernagel et al., 1999). Therefore, because the aggregate market refers to a local dimension of an insular type, we can easily deduce that its consumption is closely linked to forecasts in the Urban Masterplans (UPMs).
Optimizing the removal of materials and the impacts of the quarries on the landscape is even more urgent and possible today. This is demonstrated by data from other European countries that have reduced the amount of materials extracted through waste reuse policies drafted by the construction industry. This is the only possible way to enable a future for many areas that are otherwise condemned to a progressively degraded identity and landscape quality (Al-Awadhi, 2001). Virtuous international cases (such as England and Denmark) show that that it is possible to promote innovation and accommodate the mining industry as an interdisciplinary forefront sector, due to the strong correlation between planning tools (Rapporto Cave, 2014; Balletto, Mei, & Garau, 2015).
The Metropolitan City of Cagliari therefore has an opportunity to assess the relationship between urban planning and its use of georesources. This relationship is associated with the territorial government's planning tools, according to a smart-region paradigm (Huang & Hsu, 2003), where the use of combined natural aggregates (NA) and recovered aggregates (RA) offers the best solution for meeting demands created by the territorial government's tools (Balletto, Mei, & Garau, 2015).

Methodology

To assess the ten-year requirement stipulated by Balletto, Mei, and Garau (2005) the authors referred to the Metropolitan City of Cagliari, and selected from this one, six municipalities as case studies (Figure 1)—Cagliari, Decimomannu, Maracalagonis, Quartucciu, Quartu Sant'Elena, and Sarroch—based on the following criteria:

- Cagliari and Quartu Sant'Elena represent the most populous municipalities of Sardinia
- Sarroch is affected by a wider regional-scale industrial zone
- Decimomannu, Maracalgonis, and Quartucciu are characterized by an average rate of population increase (equal to 15.15%)

The assessment of aggregate demand (Balletto et al., 2005) has been derived from planned volumes in the UMP planning tool. The innovative aspect of this study is its introduction of a vision of the metropolitan city that has a more sustainable connotation, by assessing the needs for georesources for urban purposes that result from the UMP, following the smart region approach (Louman et al., 2015; Garau, 2014).

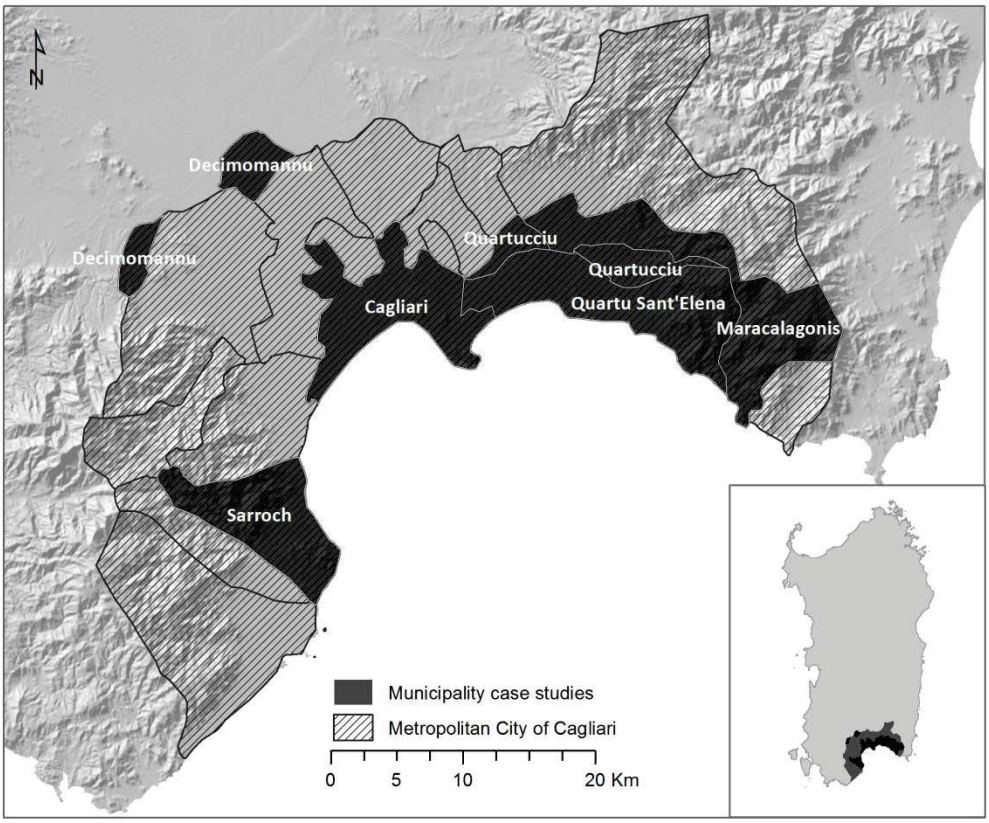

Fig. 1. The Metropolitan City of Cagliari and the six municipalities chosen as case studies (Cartographic representation of Paola Zamperlin).

Results and discussion

The results of this paper, shown below in brief, highlight that the lack of attention given to the spatial planning of georesources for the city is not consistent with the paradigm of smart regions. In particular, Figure 2 shows the trend of the remaining buildable volumes of the six municipalities selected as case studies from the Metropolitan City of Cagliari. These six municipalities are equipped with a UMP. The urban zones that allow a meaningful analysis of the remaining buildable volume and of the use of aggregates are the following: the historic center zone ("A" zone); the residential completion zone ("B" zone); the residential expansion zone ("C" zone); and the tourism zone ("F" zone). Figure 2 also highlights that the residual volume is mainly evident in the municipalities of Cagliari and Quartu Sant'Elena—the most populated urban areas of the Metropolitan City of Cagliari. This area has a multipolar structure, with different degrees of hierarchy and urban forms characterized by compact (Cagliari) and dispersed urban portions (Quartu Sant'Elena, Decimomannu etc.). Figure 3 shows that the City of Decimonannu has a higher per-capita consumption, which reveals the degree of urban sprawl.

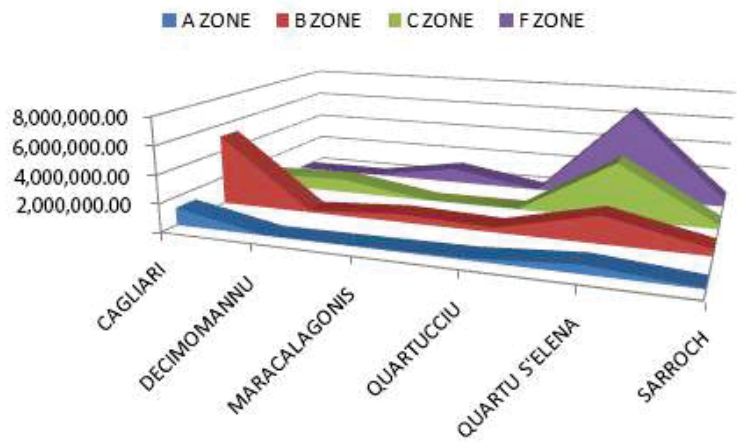

Fig. 2. Remaining buildable volume deducted from UMPs.

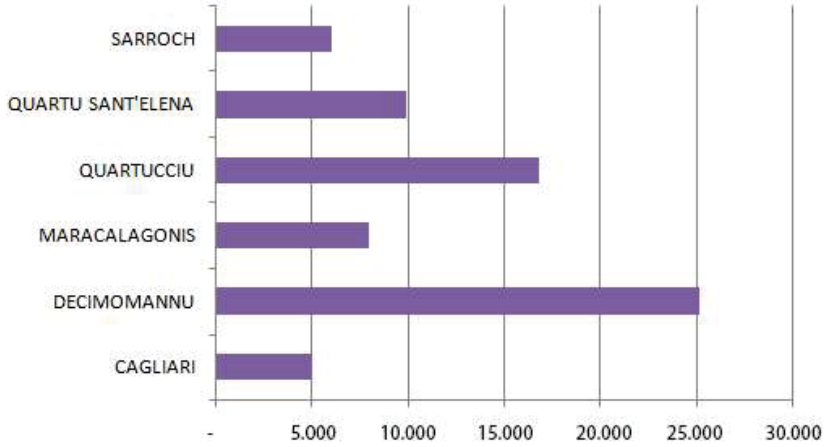

Fig. 3. Total average demand per capita (mc/ab).

In contrast, Figure 4 highlights and confirms what was previously reported: Cagliari, Quartu Sant'Elena, and Decimomannu will grow, and Cagliari and Quartu Sant'Elena will be most active in conducting maintenance activities (in relation to buildings and roads).

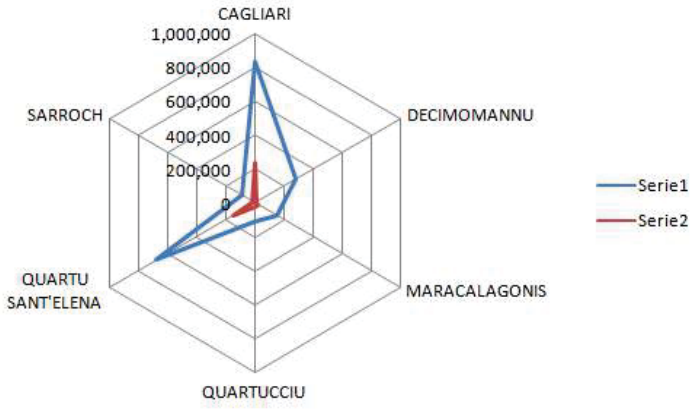

Fig. 4. Demand for new construction, maintenance-construction, and roads (mc). Serie 1: New construction; Serie 2: Maintenance-construction.

Figure 5 illustrates that the higher demand for aggregates is attributable to the implementation of the C zones, and to maintenance of the A zones. The B and F zones do not have a high need for

materials, because their infrastructure is in a good state of preservation, and therefore not subject to extraordinary maintenance. However, this assessment is only partially true. Progressive legal tools adopted in 2009, and best known in Italy as *Piano casa* (regional law [RL] no. 4/2009), are de facto no longer in use, and an unquantifiable demand has been created for the UMP. In fact, urban planning has been conducted at a frequency of about ten years, and since the eighties it has been subjected to the regulatory provisions in the *Deregulation* (Robinson, 2011), first called *Condoni Edilizi* (47/85 L, L 724/94 and 326/2003), and then *Piano Casa*. In Sardinia, the latter became law with RL no. 8, 23 April 2015. This situation, besides generating discontinuities in the implementation of the UPM, does not allow harmonious planning for the use of georesources in urban areas.

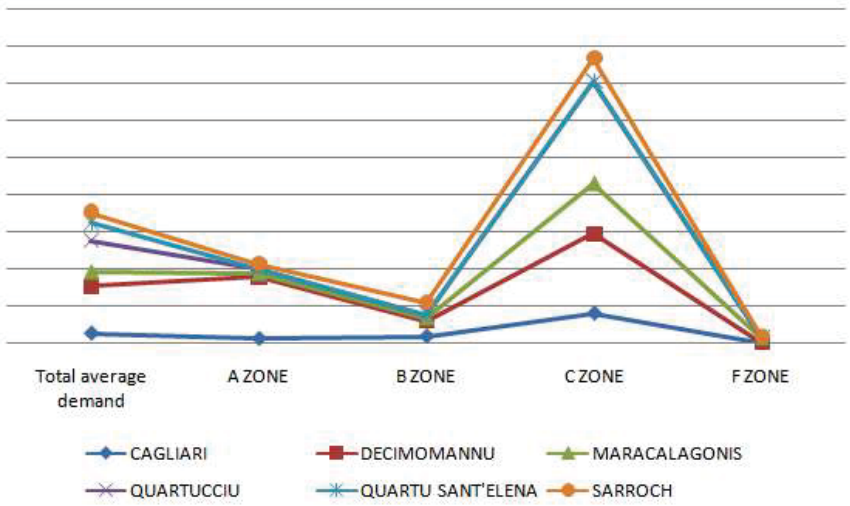

Fig. 5. Average demand per capita for homogeneous areas.

Conclusions

The formation of new Metropolitan city of Cagliari can and should lead to renewed urban development; this will occur in smart regions that fully include georesource planning. Considering the results of this paper, the UMP is the starting point for forecasting the demand for aggregates, but it is no longer sufficient for fully evaluating the requirements for georesources associated with development and urban renewal. In this context, the authors refer to the balance of research conducted for NA and RA for the Metropolitan City of Cagliari, by reducing the tax burden linked to Leadership in Energy and Environmental Design (LEED) certification (Balletto, Mei, Desogus, & Garau, 2015), for the redevelopment and expansion of buildings.

Using RA in the construction sector is the only way of containing the consumption of natural resources. Its systematic use, however, requires incentives, such as reducing the tax burden with respect to specific environmental certifications such as LEED.

In particular, the combined actions of the needs assessment, associated with the UPM, and, more generally with the metropolitan urban masterplan (MUMP)—in which the reduction of the tax burden is considered at the time of LEED certification, following the use of RA—directs urban planning towards a smart region vision, that otherwise would be omitted due to the indirect effects of the deregulation of regulatory tools such as the recent *Piano Casa*.

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