

## **METROPOLITAN AGRICULTURE, SOCIO-DEMOGRAPHIC DYNAMICS AND THE FOOD-CITY RELATIONSHIP IN SOUTHERN EUROPE**

*Andrea Colantoni<sup>1</sup>, Silvia Pili<sup>2</sup>, Enrico Maria Mosconi<sup>3</sup>,  
Stefano Poponi<sup>6</sup>, Massimo Cecchini<sup>1</sup>, Paola Doria<sup>4</sup> and  
Luca Salvati<sup>5</sup>*

<sup>1</sup> Department of Agricultural and Forestry Sciences (DAFNE),  
University of Tuscia, Via S. Camillo de Lellis, 01100 Viterbo, Italy;  
colantoni@unitus.it, cecchini@unitus.it

<sup>2</sup> Department of Architecture and Project, Sapienza University of  
Rome, Italy; silvia.pili@uniroma1.it

<sup>3</sup> University of Tuscia, Department of Economics and Entrepreneurship,  
Viterbo, Italy

<sup>4</sup> Italian Council for Agricultural Research and Economics (CREA),  
Policy and Bio-Economy Research Centre, Italy; paola.doria@crea.gov.it

<sup>5</sup> Italian Council for Agricultural Research and Economics (CREA),  
Forests and Wood Research Centre, Italy; Sapienza University of Rome,  
Department of Social and Economic Sciences; luca.salvati@uniroma1.it

<sup>6</sup> Niccolò Cusano University, Department of UNISU, Via Don Carlo  
Gnocchi, 3, Rome, Italy.

\* Correspondence: colantoni@unitus.it; Tel.: +39-0761-357-356  
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## ABSTRACT

Peri-urban agriculture is a pivotal issue in the debate on sustainable management of land in metropolitan regions worldwide. Multiple socioeconomic and environmental solutions introduced by new models of peri-urban agriculture are playing an important role in planning and management of fringe land. The recent development of peri-urban agriculture in Southern European cities was supposed to reflect latent, crisis-driven processes of 'coming back to land': new land has been extensively cultivated, and new relations have been created between farmers, communities and territories within peri-urban areas. This study describes some relevant experiences of peri-urban farming in 6 metropolitan regions (Lisbon, Barcelona, Marseille, Rome, Athens, Istanbul) representative of different socioeconomic contexts in Southern Europe, outlining strengths and weaknesses in the use of fringe land for cropping, and evidencing relevant implications for urban sustainability.

**Keywords:** Urban growth, Cropping systems, Fringe land, Food security, Mediterranean.

## 1. INTRODUCTION

Aiming at a territorial balance between rural and urban areas, peri-urban agriculture emerges as strategic issue in sustainable management of fringe land [1]. During the last decades, peri-urban areas expanded shaping mixed landscapes that are neither urban nor rural, although these acquire fundamental features of both territorial typologies [2]. As a product of their peculiar geographical location, the recent growth of peri-urban settlements produces rapidly changing socioeconomic interactions and spatial interdependencies which stimulate farmers - the main players in this latent transformation - to face with different practices of land management [3].

The definition of urban and peri-urban agriculture provided by Food and Agriculture Organization [4] refers to all those agricultural practices carried out within and around cities that provide goods and services and that can meet the demands of urban populations. By fulfilling functions related to the social, economic, environmental, ecological and symbolic dimensions, cropping systems in peri-urban areas may provide an effective contribution to cities' sustainability and resilience [5]. The importance of green spaces, often

considered as areas just waiting for speculative building use, emerges in relation to the country's ability to safeguard and preserve land - linked to the social, environmental and economic potential offered by these spaces.

Going beyond the traditional functions of production of goods (food and natural textile fibers), the initiatives linked to agriculture, horticulture and gardening, are rich in socioeconomic and environmental values. Through the realization of projects related to green areas within and inside the margins of the cities, several spaces have been created to satisfy the desire for naturalness and rurality that pervades today's citizens so that in multifunctional agriculture they can find places to realize leisure, didactics and aggregative activities. In addition to the production of recreational landscapes, agriculture contributes to the creation of employment, social and cultural services, thus representing an opportunity for income generation and/or self-consumption, especially for economically disadvantaged groups [6].

Peri-urban agriculture is basically related to the issue of food security. Demographic decline in rural areas and the consequent concentration of population in metropolitan areas, highlights the role of peri-urban agriculture in respect with the ability to provide adequate access to high-quality products, as it contributes to the availability of fresh local food and to the maintenance of healthy populations [7]. The agricultural management of green spaces is currently playing an important role in territorial policies of cities and metropolitan regions, as useful tool for limiting urban expansion and contributing effectively to biodiversity conservation. Open areas and urban voids, that have hitherto been considered as less relevant areas for environmental protection, re-acquire importance within a sustainable land management strategy for fringe land. Urban green belts and agricultural parks give practical opportunities for the creation of multifunctional environmental networks that can be enjoyed by local populations [8]. The European Landscape Convention has evidenced the shift from an essentially-aesthetic conception of landscape to a notion that considers landscape as a fundamental element of cultural and natural heritage - and hence as the basis of the social and individual well-being of the population [9]. This cultural shift has brought attention on the need to safeguard and manage agricultural spaces, creating opportunities to sustain farmers' incomes and to protect fringe land [10].

The economic crisis has strongly influenced local communities. Often reflecting local contexts suspended between advanced economies and urban poverty, Mediterranean cities are recently experiencing a revitalization (or slow recovery) of traditional farming practices. This process is accompanied by the preservation of the wrecked natural landscapes, which has made it

possible to consolidate new relationships between resident population and peri-urban landscapes [11]. In these conditions, peri-urban agriculture assumes different shapes and roles depending on the relationship between the new urban realities. As indicated by [12] in a study on peri-urban agriculture in the Mediterranean basin, various categories can be recognized, such as specialized family farming and multifunctional agriculture. The modalities characterizing agricultural production in Mediterranean fringe land are decisive for ecological functionality and, therefore, for human well-being at all its dimensions. The emerging interest in this phenomenon is linked to a whole range of issues, including the demand for quality and transparency with respect to the products consumed daily by urban populations. Based on the recent flowering of "ethical purchasing groups" within local markets, the support to short food supply chains represents a success factor in both environmental and economic terms, indirectly contributing to the reduction of the carbon emissions due to a progressive reduction of delivery expenses.

## **2. URBAN AGRICULTURE, DEMOGRAPHIC DYNAMICS, SOCIO-SPATIAL PATTERNS: CASE-STUDIES IN SOUTHERN EUROPE**

Socioeconomic transformations have involved the Mediterranean region since the Second World War, determining the progressive abandonment of the traditional agricultural landscape and the massive expansion of urban areas. Being unable to adapt themselves to the processes of industrialization and specialization of economic productions required by global markets, the small businesses have progressively disappeared. The economic marginalization of the primary sector has led to contrasting effects, including a thorough increase in forest areas over the last few decades, although a permanent loss of fertile soil was correlated in the Mediterranean basin to the processes of urbanization, industrialization and infrastructure development [13].

Faced with such changes, a new relationship between town and country has emerged. Peri-urban agriculture became suitable to the realization of projects of public interest, constituting itself part of broader natural infrastructure networks. About the supply of public goods by agriculture, it should be noted that supply processes have changed over the last decades following the evolution of the demand [14]. In this direction, based on the estimated demographic growth that will affect the Mediterranean region over

the next few decades, together with ever-growing migratory phenomena, it seems to be important to deepen issues linked to food security, which are in turn depending intimately on the relationship between rural areas and central cities. The structure of the Mediterranean cities is rapidly evolving and is often characterized by settlement informality and planning deregulation leading to densification of peri-urban fringe land and growing population in suburban areas [10]. In this context, the traditional relationship between urban rural societies has been progressively redrawn. Within half century, population living along the Mediterranean basin is passing from less than 300 million inhabitants in 1970 to more than 500 million in 2020 [6]. The demographic dynamics interesting the area led the agrarian issue in the contemporary debate on the increasing urban poverty, food security, and city planning, focusing also on non-renewal natural resources [15]. Peri-urban agriculture contributes to sustainable urban planning strategies dealing with food security, social inclusion and fight against poverty [16].

Along with strategic urban planning, designing open spaces plays an important role both on a metropolitan scale and on a local (district) level, contributing to the metropolization of peri-urban areas and shaping more habitable and vital territories [17]. However, since peri-urban territories are subjected to multiple urban pressures, they face problems such as water and soil pollution, due to the proximity of competitive or incompatible (i.e. potentially or directly damaging) activities with the agricultural sector. In this sense, the mere economic support to agricultural enterprises is not sufficient unless supporting an appropriate management of natural areas, land resources and biodiversity [18].

With the breakdown of the traditional urban-rural relations resulting from new settlements, the need for reconciling the urban and rural spheres, that are constantly evolving, has become a major source of dialogue and vitality [19]. Multifunctional agriculture revealed able to create meeting spaces addressing territorial needs, thus playing an important role in terms of regional planning [17]. Furthermore, with the introduction of the concept of multifunctional agricultural enterprises, the concept of agricultural activities has been extended to several activities as reception and hospitality activities, territorial enhancement, rural and forestry heritage. Being together the residence and the source of self-consumption of farmers, farms offer specific services for urban populations, responding to the need for open spaces with a variety of opportunities [20].

Multiple socioeconomic and environmental solutions introduced by new models of peri-urban agriculture are playing an important role in planning and management of fringe land [21]. The recent development of peri-urban agriculture in Southern European cities was supposed to reflect latent, crisis-driven processes of 'coming back to land': new land has been extensively cultivated, and new relations have been created between farmers, communities and territories within peri-urban areas. Based on these premises, the present study reviews some relevant experiences of peri-urban farming in 6 metropolitan regions (Lisbon, Barcelona, Marseille, Rome, Athens, Istanbul - from western to eastern Europe) representative of different socioeconomic contexts in Mediterranean Europe, outlining strengths and weaknesses in the use of fringe land for cropping, and evidencing relevant implications for urban sustainability and planning of metropolitan regions in developed countries under progressively more volatile economic cycles and increasingly exposed to financial crisis.

## 2.1. LISBON

Representative spaces of the historical gardens in the Portuguese capital, the so-called “quintas de recreio” or backyard gardens, have been recognized as ancient types of urban agriculture providing fresh fruits and vegetable to the citizens of Lisbon from XVI to XVIII centuries [22-23]. Confirming the historical agricultural feature of the city, a study on the urban agriculture in Lisbon between 1898 and 1911 [24] revealed that, at the beginning of the last century, the Lisbon's district was characterized by high rates of workers in the agricultural sector and that, with only 16% of built up areas, a great part of the territory was used for agricultural purpose. The vitality of the primary sector - and consequently the rural way of life typical of the Portuguese society - remains relevant until the 1950s. Active population in the agricultural sector was than 5% in 2001.

Coinciding with the crisis of the 1970s and the post-colonial migration wave, the cultivation of green urban areas has characterized a part of the Lisbon's urban contemporary history: alongside other economic activities, poor urban families started occupying marginal areas as part of their survival strategy. Cultivation of green peripheral spaces was representing a strategy of self-sufficiency for disadvantaged groups of migrants living in the shantytowns [25].

Since the 1990s the urban agricultural movement started to increase considerably in Lisbon: going beyond the subsistence issue, urban agricultural was recognized as a strategic contribution for sustainable land planning. The Plano Verde de Lisboa, presented in 1997 by the landscape architect R. Telles, was aiming to create a system of corridors connecting recreational and production areas [26-27]. Through this plan some farming parks, as Quinta da Granja and Parque Hortícola de Chelas were created [28]. Responding to food production and recreational issues, this Plan has created a continuum through natural and cultivated areas within the city. In 2009, the municipality started a project to address the reorganization and legalization of 40 ha of land, including Quinta da Granja [22]. The “Decreto Regulamentar” no. 11/2009 recognized the role of peri-urban agriculture as green infrastructure, with functions of ecological balance, open air recreation, leisure, sports and culture, agriculture and forestry.

Despite a moderate decrease of areas destined to urban gardens between 1987 and 2010 (from 300 ha to 75 ha), [29] identified a wide variety of existing urban agricultural types. Different types of non-regulated agricultural practices were investigated: illegal community-based experiences, autonomously produced green spaces. For example, the largest cultivated urban park in Portugal, Vale de Chelas, is located near the big low-income housing complex developed in the 1960s. The urban agriculture was found primarily interesting the food security issue mostly in self-built neighborhoods. Cape Verdean population was especially involved in individual farming in Talude, an autonomously produced peri-urban garden since the 1970s.

Recent studies on the peri-urban area in Lisbon [22; 25; 29-30], pointed that urban and peri-urban agriculture has a long history and that nowadays is receiving increasingly attention in the Portuguese capital. Currently, urban agriculture is integrated into political programs, community, and discourses of activists [22]. Urban farms are representative places from a sociological, geographical, and anthropological points of view [27] and the urban gardening movement “Pró Hortas Urbanas” is related with a wide variety of social issues [22].

## 2.2. BARCELONA

The metropolitan area of Barcelona has a rich presence of agricultural and wooded areas within a radius of 50 km from the city center, so that the territory is provided with a high quality of life. A factor that favors these

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features is the discontinuous distribution of middle urban centers around Barcelona. In 1983, within the Pla Territorial General de Catalunya, the Generalitat de Catalunya - that is the territorial organization of the Catalan autonomous community - defined the areas of interest for the agriculture and for forestry use. Three territorial systems were defined: (i) open spaces, (ii) settlements and (iii) infrastructures. Open spaces, which includes non-urban areas, are considered by the plan as key planning components. Towards these non-urban areas, three levels of protection were defined according to site characteristics: spaces under special protection for naturalistic and agricultural significance; areas under special protection for vineyards; areas of preventive environmental protection. With the approval of the Pla Territorial Metropolis of Barcelona (PTMB), 74% of the metropolitan area is included in the category of open spaces, of which 70% belong to special protection areas [31].

About the regional agricultural planning, specific measures for urban and peri-urban farming are not provided. Between 2009 and 2011, initiatives aimed at re-launching short-chains have been developed, so that the topic of the agri-food quality promoted a social environment contributing to protection of peri-urban areas. In this sense, the comarca of the Vallès Oriental, a peri-urban area located in the northeast of the Catalan capital, has been interested by initiatives derived from the participation to the RurUrbAI project. This project, co-financed by the European Fund within the MED Program, aimed at experimenting with models for the sustainable and balanced local development of peri-urban land through enhancement, marketing and promotion of the local agri-food products.

At regional level, subsidies were granted to the peri-urban farming parks, then cut and reduced in 2013 due to economic crisis, such as to the Gallecs and to the Parc Agrari del Baix de Llobregat (BLAP), which are close to the consolidated urban area of Barcelona. The agricultural park of the Baix Llobregat, founded in 2008, is in a context characterized by the presence of El Prat Airport in Barcelona, mixing urban centers with cultivated areas, constituting a cultural, economic and ecological heritage of over 3,000 hectares where agro-tourism is combined with alternative food networks, sustaining the short chains and the direct contact between farmers and consumers. The park also fits into the green ring of the city communicated between the Collserola Park (northeast), the Garraf Natural Park and the Oral Oblivion's Natural Interest site (west), and the Nature Reserves of the Llobregat Delta (south).



At the municipal level in Barcelona, also thanks to the impulse of the Pla del Verde y de la Biodiversidad - 2020 presented in 2013, common gardens and educational gardens were promoted in line with the EU Biodiversity Strategy. The first urban garden in Barcelona, the Hort de L'Avi, was created in 1986 and supported with the initiative of a group of residents in the district of Gràcia. The gardens, as also the products of such gardens established with the Pla del Verde, respect the principles of organic farming. In 2012, the municipality of Barcelona promoted the first edition of the Pla BUIITS (Buits Urbans Amb Ambition Territorial and Social): this is a competition ideated by the Ecologia, Urbanisme i Mobilitat department, which aims to regenerate disused land within the city of Barcelona. The initiative involved no-profit entities, associations and foundations for the temporary management (from 1 to 3 years) of disused green areas and for the implementation of projects of public interest. The projects cover educational, sports, recreational, artistic, environmental, landscape and social offerings and contemplate the temporary, removable or compostable installation of artifacts. The second edition of the plan was launched in 2015.

About twenty projects started and are distributed in various areas of the metropolitan area of Barcelona. Between 2013 and 2015, in conjunction with the Pla BUIITS, the Pla de Microurbanizaciones was ideated by the municipality of Barcelona to regenerate small public space with extension of 200 to 6.000 m<sup>2</sup> and to convert them into proximity open spaces enjoyable by the citizens. The plan regards low-cost interventions (from 14 to 300 €/m<sup>2</sup>) that are conceived around the needs of the individual districts, where the design of the project, the reduced ecological footprint and free services enjoyable by the residents are factors of primary importance. In 2013, the European Cost-Action Urban Agriculture Europe Project carried out an investigation over the vineyards of the Alella's area, a Protected Designation of Origin (PDO) located in the periurban area of the metropolitan area of Barcelona. Alella is a wine region that involves 28 municipalities extending 314 hectares. The non-urbanized area in the Alella's protected area extends 68% of the total area, of which a large part is covered by forest and 18% by farms. The vineyards, which are historically present throughout the wine region, have suffered a major decline since the late 1980s due to the emergence of Phylloxera (*Daktulosphaira vitifoliae*). Since the 1990s a variety of abandoned grapes (e.g. Red Grapes of Matarò) has been re-introduced. Urban sprawl has reduced the extension of vineyards (and other tree crops) to highly fragmented peri-urban contexts which are requiring specific recovery efforts [32].

### **2.3. MARSEILLE**

As the other investigated metropolitan areas, Marseille presents a long tradition of agricultural vitality within the urban area and at its margins [33-34]. A representative type of agriculture that characterized the history of urban gardens in Marseille is family gardens. In line with socioeconomic processes occurred in the XX century, the family gardens were relevant elements of the food supply in peripheral areas during difficult times [35]. From having the status of self-sufficiency practice between 1900 and 1945, and from being the privileged witnesses of the different phases of urbanization, the family gardens have become true territorial laboratories of urban agriculture in the French Mediterranean region [33].

At the beginning of the XX century, small-scale plots were widespread in urban and peri-urban areas to address self-consumption purposes. As reported by Consales, the first “collectifs de potagers” has been established in the industrial suburbs, such the districts of the Huveaune valley (St-Julien, St-Barnabé) and Canet, where working classes were concentrating; other family gardens were existing in peripheral sectors such as Mazargues and Montredon. With the Great War, the number of family gardens multiplied and land without use (wasteland, vacant lot, municipal lot, ballast lot) were requisitioned for cultivation [36]. Claimed by a population aggrieved by rationing, urban vegetable gardens represent, in fact, an essential element in the improvement of living conditions [37].

During the economic boom of the 1960s and 1970s, under the pressure of urbanization processes, the phenomenon of the family gardens experienced a strong decline. In recent times gardens disappeared from the urban landscape of Marseille due to sprawl. The municipality promoted the creation of shared gardens with the promulgation of the Charte des jardins partagés: in this document the plural functions of the urban gardens in social, environmental, landscape and economic terms were highlighted [34]. If on one hand the tradition of the jardins partagés still survive through the numerous projects that are present in Marseille (jardin des Tuileries, jardin de La Solidarité, jardins de Font Vert, jardin Bricarde), nevertheless, several members of associations converge on finding weak political efforts oriented to the maintenance of the agricultural spaces, as urban expansion has reduced the extent of the crops and has created large areas of contact between built and non-built areas [38].

In line with the general marginalization of the sector and under the advance of urbanization, the agricultural landscapes have undergone structural transformations. In the Huveaune valley, for example, the strong pressure of urbanization determined the decline of the agricultural features of this area. Nowadays the valley is a representative peri-urban area, a place of contrasts between the natural and the artificial elements of the landscape: surrounded by mountain massifs, characterized by terraces, irrigated valley floor areas, continuous built up areas, factories and commercial areas, the valley is composed by a heterogeneous mixed use of land [39]. Overall the area of the Bouches-du-Rhône department experienced recent changes linked to urbanization processes that has caused a spatial upheaval from the 1950s [40], while the infrastructural development has generated high levels of landscape fragmentation [41].

## 2.4. ROME

The historical presence of gardens in the city of Rome can be traced through a well-known map of the city at the pre-unification times. The "New Master Plan of Rome", realized by G.B. Nolli between 1736 and 1744, reflected the image of a city plenty of villas, vineyards and gardens: these land-uses occupied two-thirds of the whole area inside the Aurelian walls (the walls existing since the Roman empire). As described by [42] large villas, gardens and woods in the city of Rome have been destroyed to construct residential settlements during the so-called "building boom" beginning in 1871 with the election of Rome as the capital of Italy. During the first and second wars' periods, the urban gardens returned widespread in the city of Rome to ensure food supply to the most economically-disadvantaged social groups. Some famous examples are the family gardens realized under the ancient aqueducts east of Rome. In the neighboring areas of Rome, peri-urban agriculture was an important element of local economies until the years of the economic boom [43].

Since the 1970s, the modalities of urban expansion, which were increasingly taking the characteristics of settlement discontinuity and dispersion, accompanied the urbanization of the rural hinterland [44]. Land-use transformations has been favored by the abandonment of the agricultural activities. The urbanization of previously cultivated land took place in different ways: along the meshes of the infrastructure networks, with the radio-centric expansion of pre-existing villages, with the creation of new cities in high-potential agricultural contexts and, finally, by increasing low density

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settlements dispersed across rural districts [45]. While the city's growth between the 1960s and the 1980s has followed a substantially compact model, starting from the 1990s it begins to be interested by sprawl of the metropolitan area, thus determining a transition from a typically mono-centric spatial organization to some dispersed and moderately polycentric models [6].

Taken together, Rome is an emblematic case for its history of agricultural development, which still makes it the largest agricultural municipality in Europe. The municipal area of Rome extends 128.530 hectares and holds a utilized agricultural area (UAA) of more than 37 thousand hectares. The total agricultural area is about 51.000 ha, an extension that is slightly lower than the whole size of the city of Madrid (one of the largest urban municipalities in Europe). Three are the main factors concurring to determine such a peculiarity: (i) the vast extension of the municipality of Rome, (ii) the presence of large green areas - partially protected - inside and outside the city, and finally (iii) the traditional relationship between the city of Rome and the neighboring agricultural areas. The strong link between the urban population of Rome and the surrounding agricultural areas is historically acknowledged: this relationship can be better understood if related to the distribution of urban and peri-urban settlements on the metropolitan territory. The lack of large farms (50-100 ha) in the city of Rome and the abundance of small and medium size farms (up to 10 hectares) reveals an extremely fragmented farming structure [43].

From a study on urban agriculture in Rome [46], it has been detected that agriculture - after having experienced a remarkable fall in the agricultural land utilized between 1990 and 2000 - recorded a moderate growth between 2000 and 2010 (14%). The presence of short chain models was considered a proof of the new relationship between citizens and producers, as it creates a direct contact between them, supporting a mixed quality production. More than 60% of farms in the municipality of Rome sell their products to a network of local markets, both authorized and informal. The localization of farms is characterized by the proximity to the road axes that radiate from the city center, highlighting the centrality of exchanges that take place with urban environments.

Currently there is a wide diversification of agricultural experiences in the metropolitan area of Rome. Initiatives linked to the green spaces, alongside widespread urban gardening, have experienced the flourishing of professional activities aimed at selling agricultural products. The results of the census on the areas cultivated inside the GRA - a survey carried out by the Environment

Department of the Municipality of Rome between 2003 and 2006 - showed a diversified reality of agricultural activities disseminated in all urban districts [47]. As an evidence of the recognition of the value of agriculture in the urban sustainability planning, the Department of Heritage, Development and Valorization of Rome municipality published in 2014 a call for the assignment of municipal rural properties aimed at protection and recovery of the productive functions of the 'Agro Romano' (Roman countryside) through the development of multifunctional farms. The call has seen involved young (and aspiring) farmers with less than 40 years to design new proposals related to organic farming, biodiversity conservation, social inclusion of disadvantaged people, social and didactic farm. The allocation of the plots (each one extended on 100 hectares) is set for a period of 15 years and the farmers can enjoy easy access to the farmer's local market benches.

In 2010 the UAP Study of Architecture and Landscape of Rome initiated the mapping of shared green spaces of the Italian capital. The results were available through the "Zappata Romana" web page and bring out an outstanding reality of formal and informal associations dedicated to the care of urban and peri-urban green spaces. In 2013, there were 154 shared green spaces (Figure 3) of which 66 gardens, 58 gardens, 30 "spot gardens" or rather urban green spaces regenerated through guerrilla gardening activities realized by groups of citizens. For example, the Genuino Clandestino's experience appears to be of particular interest in facilitating direct relations between farmers and consumers: Genuino Clandestino is a national network that supports small farmers that are in trouble against the implementation of the EU legislation on hygiene of foodstuffs - which require the standardization of equipment and production facilities and transformation - and that, supporting direct links between consumers and small farmers, experiments with different models from those of the big distribution. Many farmers, by self-denouncing in front of the consumers as a "clandestine" or "not according to the law", joins to Genuino Clandestino to give voice and to spread the different instances of farmers that operate on a local scale through the direct sale to the final consumer.

Among the urban regeneration projects aiming at the creation of urban gardens, the Garden of the Palms in the Centocelle urban district (Municipio VII) is a representative result of a participatory process began in 2010 and that involved several subjects such as the residents, the senior center entitled to Nino Manfredi, a well-known Italian movie actor, the Forte Prenestino's squat and various associations. The garden is large 2 hectares being situated between

the buildings of the neighborhood and bordering the area of Forte Prenestino, eastern periphery of Rome. The garden is intended as a multifunctional open space with educational gardens, playgrounds, exhibitions and performances, so that the public can enjoy it as a place of conviviality and leisure. The project saw the participation of architects, landscapers and agronomists and received regional funding through the Municipio VII district, on behalf of Rome's municipality.

## 2.5. ATHENS

Consistent with the socioeconomic changes that have invested Europe in the post-war period, Greece experienced major transformations in its traditional rural landscapes: high quality agricultural and historical-cultural contexts have been converted to urban uses with consequent loss of historical functions and identities. In the Athens' context, especially since the early 1990s, due to urban expansion, the agricultural areas have been pushed into remote districts far away from the city center. A recent research related to the impact of various type of urban expansion patterns on peri-urban agriculture [21], outlines that, while in the urban area of Athens, the cultivated areas dropped from 4% in 1960 to 2% in 2000, the cultivated areas persisted as a major component of the landscape within the rest of the metropolitan area, recording a slight decrease between 1960 and 2000 from 33% to 30%.

In the last fifty years the Athens' metropolitan region has been invested by alternating phases of compact growth and urban sprawl [48]: the population density of the city center has doubled over half century; but also, the suburban population has experienced an increase in population density [49]. The great infrastructural development that occurred in the 1990s facilitated the expansion of Athens urban area beyond its traditional boundaries (Hymettus, Parnitha, Egaleo and Penteli mountains) driving the city's expansion toward the fertile plain of Messoghia, an historically cultivated area located 30 km east of Athens, renowned to produce fine wines, where small rural villages were existing since centuries. The Eleftherios Venizelos international airport was built in this area during the 1990s.

Nine municipalities located around the new airport experienced some relevant increases in resident population during the decade between 2001 and 2011 (from the Hellenic Statistical Authority). In the 2004, with the celebration of the Olympic Games, identified by [50] as the urban "engine" of

Athenian sprawl, it started the last major wave of urban dispersion that has led to the transformation of the hinterland territory. An emblematic case of the phenomenon of urban agriculture in Athens is represented by the Thriasio coastal plain in the west Athens suburb, that is surrounded by the Egaleo mountains to the east, Parnitha to the north, Pateras to the west and the Gulf of Elefsina to the south. In the historically agricultural area of Thriasio, recent surveys have revealed a low number of workers in the primary sector (10% of the active population) compared to 25% of the workforce employed in the service sector, and the remaining 65% in industry. The abandonment of cropland and unique landscapes of the Mediterranean rural culture has given way to rapid urban sprawl, traffic congestion, conflicts for land-use and environmental degradation [52]. The plain of Thriasio today constitutes the peri-urban territory closer to the city center: agricultural, speculative and industrial activities (steel mills, oil refineries, cement and chemical industries) are interlaced resulting in a mix of functions typical of peri-urban areas [6]. During the last decade, there has been a rapprochement of the local community to agricultural activities. Eleusi and Mandra, that are traditional farming centers of the region, have experienced a progressive re-colonization of abandoned land, with the recovery of traditional practices and techniques.

A research on traditional rural landscape elements in Attica [6] demonstrated the reactivation of some fountains for collecting rainwater for irrigation purposes. A group of farmers has spontaneously opted for a return to the agricultural activity to tackle the economic crisis. By re-occupying abandoned rural spaces, they preserved characteristic elements of the rural world. The dry pistachio crop, a production confined in the preceding decades to the island of Aegina, was also recovered. Currently, the traditional agricultural techniques represent tools for application of sustainable practices that have been preserved through the centuries by the rural world to deal with the seasonality of the region. Today, these techniques are becoming even more valuable to tackle climate change and the scarcity of rainfall which sometimes characterizes the Mediterranean area, exacerbated by heat-waves that are increasingly observed in urban environments.

## **2.6. ISTANBUL**

Istanbul has been realistically represented as rich in urban gardens or “bostans” [52]. These traditional vegetable gardens and orchards are characteristics of the traditional urban landscape of Istanbul and of the city outside the walls with the large scale bostans producing food supply for the

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city dwellers [53]. The long historical background of the peri-urban and intra-urban agriculture in the city survived almost until the 1970s, when urbanization had become increasingly faster. Several authors converge on the fact that, with the massive population growth from the 1980s [54], the city was delivered to real estate speculative investments; agricultural and natural land was losing space with the transforming urban landscape. As highlighted by [55], most of the bostans have disappeared until that, nowadays, the heritage of the ancient gardens results drastically reduced to three: Yedikule (in the district of Fatih), Kuzguncuk (Üsküdar) and Piyalepaşa (Beyoğlu).

In recent times, a renewed interest in the realization of urban gardens was observed in Istanbul. From the protests occurred in Istanbul between 2013 and 2014, as the famous occupation of Gezi Park, several new bostans were created in the central area of the city: the bostan of Roma in Cihangir (Beyoğlu), the bostan of Imrahor in Salacak (Üsküdar), the bostan of Berkin Elvan in Rasimpaşa (Kadıköy) and the bostan of Moda Gezi in de Caferağa (Kadıköy). These gardens, created on public and private terrains, were originated by the initiative of activists and citizens engaged on the fronts of the environmental, food and policy issues. These spaces are the result of the collective acts of re-appropriation of urban contexts of life and of urban voids.

The important contribution of the new gardens of Istanbul is represented by the proposal and the realization of alternative modes of production and consumption, as also of public place for the social meeting, through the initiative of local communities. These places are currently threatened by the political decisions of the municipality. In 2014, for example, the bostan of Gezi, was partly damaged in the construction of a parking. This urban garden, large 50 m<sup>2</sup> and extended on two terraces in the northern part of the park, was realized by the Gezi movement, among them, ecologist activists, political movements and the collective garden project Tarlataban [56]. In the Gezi bostan beyond the crop activities, there was a strong symbolism that is representative of the Gezi movement: these gardens were invented, imagined and realized through the ideal, physical, inclusionary and participatory practices of re-appropriation of the open spaces of the city.

### 3. DISCUSSION

Peri-urban agricultural policies are now deeply renewed by three major visions and paradigms: (i) urban sustainability, (ii) food security and (iii) return to rural economy [57]. In this context, however, during the last century



the Mediterranean rural landscape has been characterized by declining cultural richness and natural biodiversity because of human-nature interactions. The expansion of urban areas gave new shape to the relationship between city and countryside. Currently, urban expansion and preservation of fringe landscapes are phenomena with significant socioeconomic, territorial and environmental implications. The conservation and recovery of the rural landscape within rapidly evolving urban fringes is one of the tools which have been recently recognized as key elements of an integrated planning of metropolitan land.

The rapid demographic growth of the last five decades has guided the expansion of the Mediterranean metropolitan areas. Along with the socioeconomic and political transformation of the rural world, it occurred a general abandonment of the countryside and an unprecedented growth of urban areas. In this context, peri-urban regions recorded the highest population growth in Greece, Italy, Spain and Turkey [6]. The urban sprawl processes that affected the Mediterranean cities contributed to the fragmentation of forest areas and the degradation of agricultural land in hilly and plain areas, thus altering the traditional urban-rural gradient [58, 59].

In contemporary urban and peripheral landscapes, however, there are changes that point to an on-going phenomenon of 'coming back to land'. The processes currently affecting the agricultural sector in urban and peri-urban areas reflect changes involving agriculture, landscape and the production of new forms of hospitality, reception and service to the inhabitants of the cities. The organization of agriculture, in fact, plumbs the supply of products and services around urban demand, determining that this demand results not necessarily limited to the agri-food products but, conversely, that is able to bring social and environmental contents with the creation of employment, as also educational and cultural opportunities. Within the urban spaces, the cultivation of abandoned public and private areas reflects a new dimension in the care of daily living spaces. These spaces do not necessarily have to meet the food needs but also other types of needs as urban regeneration, spare time and recreation: urban gardens, areas converted into common gardens, leisure equipment, are supporting new social relationships and creating new spaces for citizens' interaction.

The spread of new urban and peri-urban land-use patterns is reflected in the multitude of the existing realities and projects throughout the European context, which reveal, on the one hand, the will of the metropolitan communities to become protagonists of the management of the urban green areas and, on the other hand, a considerable awareness to soil consumption.

There are various European examples of processes related to the active management of open spaces in disuse: in Berlin, the Prinzessinen Garten is the result of an alienation process of a public space from a project of privatization and was made possible through the participatory mobilization of the local community. The area is in the center of Kreuzberg and extends over 6.000 m<sup>2</sup> as a public space financed with a self-supporting project alimented with the sale of vegetables produced internally and with the activity of a restaurant located in the garden itself. It represents a space dedicated to the urban horticulture (free from pesticides and chemicals) and to the creation of spaces of socialization: in the garden there is a café, a restaurant offering vegetables that are produced there, a play area for the kids, and, finally a library specialized on environmental themes. Located in a very multi-ethnic neighborhood (with migrants from the Mediterranean, the Balkans, Asia, Africa and Latin America), the garden reflects the great variety of its surroundings: in fact, the seeds are provided by returning residents in visit to their native land, thus increasing the diversity of the cultivated species and the links between this site and the community. The land lots are not assigned and fixed, but are spontaneously co-managed by the users of the gardens. The plantations, the irrigation of gardens, the fruit and vegetables division are carried out in a collective and autonomous way. Furthermore, the cultivation is realized in mobile planters so that the project is open to guerrilla gardening initiatives across the city.

Considering the European countries, the experiences of metropolitan agriculture seem to be varied and diverse, but essentially, they reflect a common impetus for eco-social and social management of the urban open spaces. In France, for example, through the mobilization of civil society, proximity farming constitutes a social issue [57]. Numerous, and often politicized, movements and associations (such as Terres de Liens or Terres du Lac) are supporting an approach based on peasant agriculture, proximity and support to the creation of agricultural projects in peri-urban areas. Terres de Liens, operating throughout the country, is an association that promotes land access to project proposers, starting from land research. Furthermore, the association seeks to support the project and to create the conditions for a closer ideal proximity between urban and agricultural spheres, and for this reason it cultivates in the local communities the issues of agricultural land conservation, the importance of organic productions and the proximity consumption.

## 4. CONCLUSIONS

Urban and peri-urban agriculture investigated in this article reveals the multidimensional nature of agricultural and extra-agricultural activities that are interesting the open spaces of Mediterranean cities. The presence of farmers in metropolitan contexts, besides reflecting a change in the spatial distribution of agriculture, reflects the approach of the civil society to the environmental and rural issues, followed by the revitalization of the primary sector by experimenting with new forms of relationship between inhabitants. Experiences in the cities of Rome, Barcelona and Athens, promoted by both local communities and institutional initiatives - such as urban and common gardens, regeneration of degraded spaces, professional and multifunctional farms -, reflect a renewed interest in the care and protection of the territory. The reality of peri-urban agriculture is particularly varied and is made up of a large variety of interventions from the small scale - such as the low-cost interventions for temporary management of small urban spaces - to larger scales with projects planning metropolitan areas. Furthermore, coming-back to land processes involve the management of the open spaces carried out by associations, informal groups and professional farmers can be described as a process of regional development, thus highlighting its special environmental, economic and social values.

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