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Pictures from the other side of the fringe: Urban growth and peri-urban agriculture in a post-industrial city (Toulouse, France)

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ABSTRACT

Peri-urban agriculture has preserved around central cities a land-use mosaic and contributes to the sustainable growth of metropolitan regions constituting green infrastructures, supplying urban markets, and improving social inclusion. The present study provides a quali-quantitative overview of peri-urban agriculture *vis à vis* urban expansion investigating the recent evolution of peri-urban farms (1988–2010) in Toulouse, the fourth largest metropolitan region in France. Socioeconomic dynamics in the study area, are representative of latent spatial and functional relationships between urban growth and peri-urban agriculture in contemporary European cities. Two complementary approaches were developed (i) identifying and analysing socioeconomic and environmental indicators that characterize changes over time in peri-urban agriculture by linking urban expansion with the evolution of fringe land-use; and (ii) carrying out a qualitative survey on a sample of farmers with the aim to relate farms' evolution strategies and land-use dynamics. Results of the present study indicate that urban expansion affects the characteristics of peri-urban farms, altering economic size, crop productions and social characteristics of farmers, and widening the spatial divide between large enterprises located in the peri-urban periphery and smaller farms in the immediate surroundings of urban areas. The qualitative survey investigates farmers' strategies to maintain their business in peri-urban areas. By recognizing that structural and functional characteristics of urban growth are interpretative keys to identify sustainable land management strategies, the role of peri-urban agriculture is finally outlined according to the empirical evidence from different socio-economic contexts in the study area.

1. Introduction

Urbanization has recently transformed agricultural areas into mixed spaces characterized by landscape fragmentation and a typically peri-urban socioeconomic context (Tacoli, 1998; Van Eetvelde and Antrop, 2004; Serra et al., 2014; Cuadrado-Ciuraneta et al., 2017). Especially discontinuous urbanization has been frequently associated to convoluted landscape structures and rapidly-evolving socioeconomic structures (Prost, 1991; Vanier, 2007; Roux and Vanier, 2008; Pili et al., 2017). In this line of thinking, recent studies have promoted a comprehensive understanding of socioeconomic dynamics in peri-urban spaces (Allen, 2003; Barbati et al., 2013; Colantoni et al., 2016), demonstrating that urban sprawl has influenced land-use patterns and social organization of rural societies around cities (Busch, 2006; Salvati and Gargiulo Morelli, 2014; Serra et al., 2017).

The 'peri-urbanization' notion involves a series of socioeconomic processes characteristic of fringe districts in the immediate surroundings of central cities (Durbiano, 1998). It is widely recognized how peri-urbanization has progressively altered contemporary rural landscapes, negatively influencing ecosystem processes and services, fragmenting or depleting traditional farming systems, modifying land value and reducing social cohesion of local communities (Munton, 2009; Gant et al., 2011; Pastur et al., 2012; Recanatesi et al., 2016). Having expanded in a context of mono-centric urban growth (Bonnin-Oliveira, 2012), French metropolitan regions have been often characterized as representative cases of 'peri-urbanization' in Western Europe (Jaillet, 2004; Roux and Vanier, 2008).

Farming spaces have been progressively transformed in continuous and discontinuous urban fabric with the uneven development of infrastructures and settlements (Verspecht et al., 2005; Hailu and Brown, 2007; Hewitt and Hernandez-Jimenez, 2010). These socioeconomic dynamics have confined farms to peripheral land especially in

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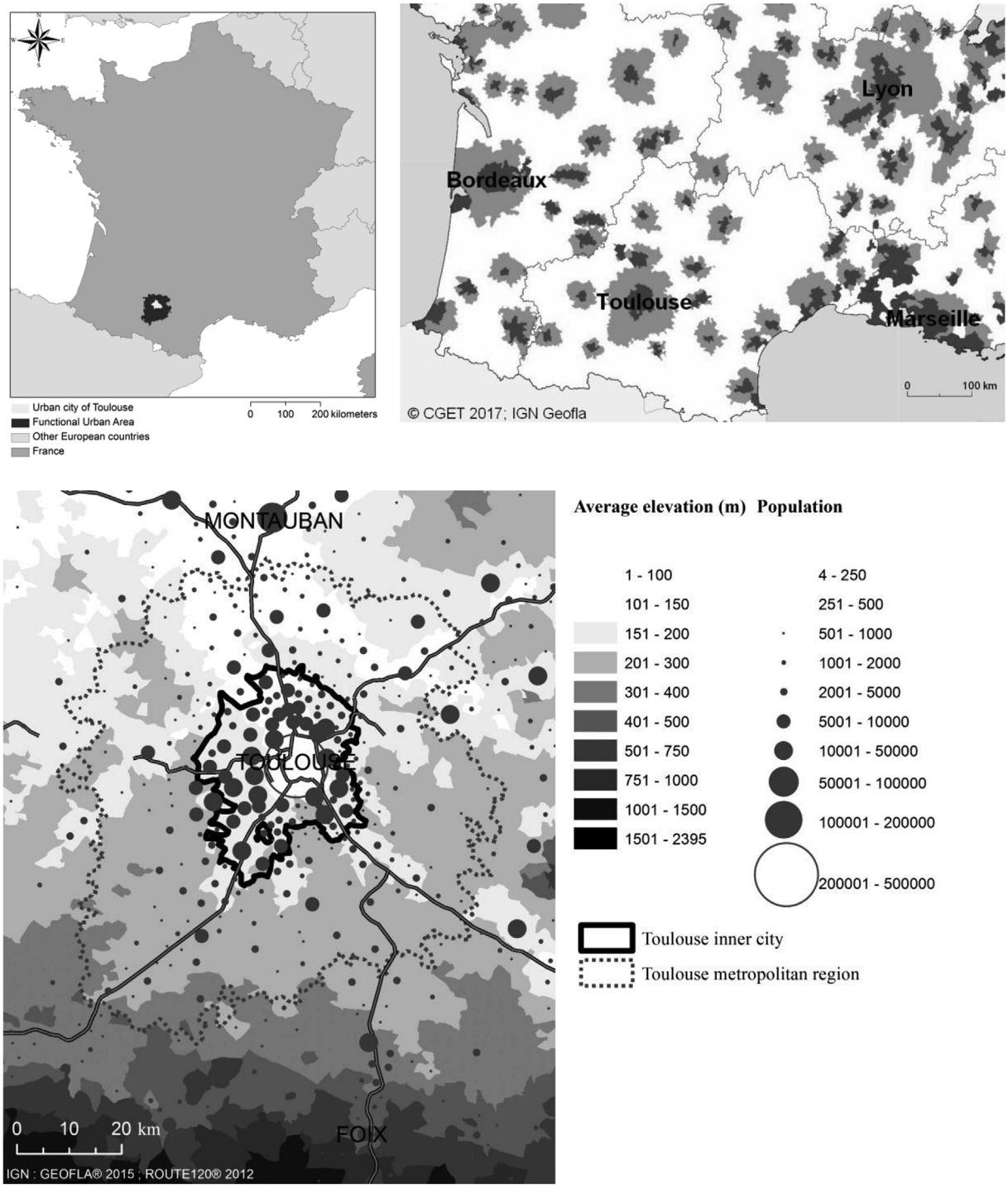

Fig. 1. The geographical position of Toulouse in France (upper left); the main metropolitan regions in central-southern France (upper right); population density and elevation in the metropolitan region of Toulouse (lower map).

metropolitan regions experiencing a rapid increase in population density, unregulated urban expansion and uneven loss of fertile soils (European Environment Agency, 2006). However, agriculture in peri-urban districts contributes to sustainable development of those areas, containing urban expansion, providing ecosystem services, facilitating social inclusion and consolidating the food security of the local communities (Birley and Lock, 1998; Antrop, 2004; Busch, 2006; Biasi et al., 2015; Opitz et al., 2016). With this perspective in mind, peri-urban farming became a key issue for the European Commission since the late 1990s. A dialogue between urban and rural stakeholders focusing on the functioning of socio-environmental systems, becomes crucial (Duvernoy et al., 2005; Vejre et al., 2007; Overbeek, 2009; Zasada, 2011; Duvernoy, 2016).

Farming systems are continuously changing in European peri-urban fringes (Rothwell et al., 2015) and planning strategies specifically designed for a sustainable development of the urban-rural interface have been proposed in an increasing number of cities (Bouraoui, 2005; Catalán et al., 2008; Perrin, 2013; Bonnefoy and Brand, 2014; Duvernoy, 2016; Soulard et al., 2017). Regional planning has sometimes demonstrated to provide poorly-effective responses and solutions to regional disparities driven by specific processes, such as peri-urbanization (Bertrand et al., 2006). In this perspective, conflicts between

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