

## Chapter 9

# Urban Versus Rural: The Decrease of Agricultural Areas and the Development of Urban Zones Analyzed with Spatial Statistics

**Beniamino Murgante**  
*University of Basilicata, Italy*

**Maria Danese**  
*National Research Council, Italy*

### ABSTRACT

*Until a few decades ago it was very easy to distinguish between city and country: in most cases the edge was defined by defensive barriers. In recent times, the relationships between urban and rural areas completely changed, placing the country in a subordinate position. Consequently, many terms have been coined in order to describe the new phenomena taking place between city and country. The term adopted, “periurban area”, despite its large use, does not have a clear and unambiguous definition. Such various approaches are due to the complexity of the phenomenon to be analyzed and to the huge variety of territorial contexts in which it may reveal. The phenomenon is characterized by urban growth with soil consumption generating loss of competitiveness for agricultural activities. This paper defines more precise rules in order to describe the periurban phenomenon, using techniques of spatial statistic and point pattern analysis. This approach has been tested in the case of study of Potenza municipality. Interest in this area comes after the earthquake of 1980, when a large migration of inhabitants began towards the countryside around Potenza.*

### 1. INTRODUCTION

Analyzing the main historical urban functions, Salsano (1998) considered town walls and the market as the first basic elements of the city. First the defensive functions, then the advantages of

agglomeration principles and industrial development have led to a long migration process from rural areas to cities. In this period it was very easy to distinguish between city and country.

With the passing of time urban and rural concepts have undergone great changes. Land renting

and the expulsion of several typical urban functions outside the city increased pressure on rural areas. The city organized the countryside influencing socio-cultural, economical and functional aspects. Consequently demographic relationships between city and countryside have been changed, generating a reversal trend. New concepts are emerging: urban exodus, new conurbations, “rurbanization”, periurban countryside (Charrier, 1994). Therefore, it is not easy to define in a clear and unambiguous way which is the sharp boundary between urban and rural areas (Murgante & Las Casas, 2004; Murgante et al., 2008). Ahlqvist and Ban (2007) developed an ontology considering the degree of urbanization going from rural through exurban, from suburban to urban.

In planning literature, the periurban phenomenon has been defined in different ways. Le Jeannic (1997) describes the population displacement as the need to escape from the dense city in order to have more space and a better environment. Also, growth of periurban belt is due to high costs of flats, the need of individual dwellings and land rents (Guerois & Pumain, 2001). Since 1980s it has been less and less possible to distinguish town from country, denying the concept of two separate entities which was for many years one of the cornerstones of spatial planning (Hidding et al., 2000; Van Den Berg & Wintjes, 2000). Rural areas are more urbanized and an uncontrolled growth of periurban belts has increased the number of inhabitants. At the same time, urban areas have lost resident population gaining population in transit (Alberti et al., 1994), because of the activities concentration in urban areas. All these situations produce a huge commuting phenomenon (Cavaillès et al., 2004). The main feature of this trend is a low density of urbanization which spreads in all directions (Camagni et al., 1998). Growth of these areas is strictly related to urban sprawl, generating negative repercussions on agricultural activities. A great amount of roads have been built to improve dwelling accessibility and car is the only means of transport (Camagni et al., 2002).

This is an opposite trend compared to the period after the Second World War, when urban planners used statistical methods to give a dimension of the migratory flows towards towns. This tendency, strictly related to Urban Sprawl, is so complex to analyze, that classical statistics are not enough for a complete understanding of the phenomenon. Settlement location in zones surrounding urban areas takes into account environmental features, accessibility, agricultural losses of productivity. In order to achieve a more complete analysis it is important to analyze each phenomenon according to its spatial location, so that it is possible to consider the concentration of some events in some areas and their possible interactions. Geostatistics can be useful in order to study this problem with an innovative approach compared to the classic socio-economic techniques. This method allows an analysis which may determine the actual trend in one region. This technique has been applied in Potenza Municipality, where a migratory phenomenon began from urban to rural areas after a strong earthquake occurred in 1980. All the informative layers have been combined with a land suitability procedure in order to define a periurban fringe with a certain precision.

## 2. AN OVERVIEW OF SPATIAL STATISTICS TECHNIQUES

The main aim of spatial analysis is a better understanding of spatial phenomena aggregations and their spatial relationship. Spatial statistical analyses are techniques which use statistical methods in order to determine if data show the same behaviour of the statistical model. Data are treated as random variables. The *events* are spatial occurrences of the considered phenomenon, while *points* are each other arbitrary locations. Each event has a set of attributes describing the nature of the event. *Intensity* and *weight* are the most important attributes; the first is a measure identifying the event strength, the second is defined by the

11 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/urban-versus-rural/63760](http://www.igi-global.com/chapter/urban-versus-rural/63760)

## Related Content

---

### Multi-Criteria Decision Analysis for Identifying a Suitable Location for Groundwater Pumping Wells

D. Mimoun, S. Gaurand D. Graillet (2012). *International Journal of Agricultural and Environmental Information Systems* (pp. 72-85).

[www.irma-international.org/article/multi-criteria-decision-analysis-identifying/62067](http://www.irma-international.org/article/multi-criteria-decision-analysis-identifying/62067)

### Computational System to Support Bovine Nutritional Behavior

Olavo J. Luiz, Vanessa Aparecida de Moraes Weber, Maria Istela Cagnin, Sérgio Raposo de Medeiros, Rodrigo da Costa Gomes, Leiliane Cristine de Souzaand Débora Maria Barroso Paiva (2018). *International Journal of Agricultural and Environmental Information Systems* (pp. 22-37).

[www.irma-international.org/article/computational-system-to-support-bovine-nutritional-behavior/207753](http://www.irma-international.org/article/computational-system-to-support-bovine-nutritional-behavior/207753)

### Agricultural Waste Management for Bioethanol Production

Miss Priyanka, Dileep Kumar, Uma Shankar, Anurag Yadavand Kusum Yadav (2018). *Handbook of Research on Microbial Tools for Environmental Waste Management* (pp. 1-33).

[www.irma-international.org/chapter/agricultural-waste-management-for-bioethanol-production/206521](http://www.irma-international.org/chapter/agricultural-waste-management-for-bioethanol-production/206521)

### Factors Affecting Customers' Perceptions and Firms' Decisions Concerning Online Fast Food Ordering

Eugenia Papaioannou, Christos K. Georgiadis, Odysseas Moshidisand Athanasios Manitsaris (2015). *International Journal of Agricultural and Environmental Information Systems* (pp. 48-78).

[www.irma-international.org/article/factors-affecting-customers-perceptions-and-firms-decisions-concerning-online-fast-food-ordering/120472](http://www.irma-international.org/article/factors-affecting-customers-perceptions-and-firms-decisions-concerning-online-fast-food-ordering/120472)

### The Use of Microwave Energy at Thermal Treatment of Grain Crops

Dmitry Budnikovand Aleksey Vasiliev (2018). *Handbook of Research on Renewable Energy and Electric Resources for Sustainable Rural Development* (pp. 475-499).

[www.irma-international.org/chapter/the-use-of-microwave-energy-at-thermal-treatment-of-grain-crops/201350](http://www.irma-international.org/chapter/the-use-of-microwave-energy-at-thermal-treatment-of-grain-crops/201350)