

# **MOBILITY CORRIDORS AND LOGISTICS CLUSTERS IN SUPRA-MUNICIPAL PLANNING: CASE STUDIES ON THE A4 AND A35 MOTORWAYS IN THE PROVINCE OF BERGAMO**

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## **1. Introduction**

This study is part of the research project "SEW Line: Socio-Ecological Way for a Holistic Mobility Infrastructure Planning in Periurban and Rural Landscapes", which seeks to establish a holistic approach for the design of large-scale linear infrastructures in agricultural and periurban landscapes [1]. Within this broader framework, the present study focuses on the development dynamics of integrated land-use functions associated with motorway corridors, particularly in relation to the Logistics System.

This contribution aims to analyse the dynamics of logistics platform development near motorway corridors by examining two distinct case studies that differ significantly in terms of development period, geographical location, and scale. The first case is the logistics cluster surrounding Bergamo – Orio al Serio airport, covering an area of approximately 16 km<sup>2</sup>, which benefits from its proximity to the A4 motorway (Turin – Trieste). In this peri-urban area near Bergamo, industrial and commercial expansion was already well-established between the 1980s and 1990s. The second case is the logistics cluster that has emerged along the A35 "Brebemi" motorway (Brescia – Milan) in the southern part of the Province of Bergamo, in the upper Po Plain. This cluster spans a much larger area, approximately 265 km<sup>2</sup>, and has seen rapid development, particularly since 2015, following the opening of the A35 motorway. This more recent growth has taken place in a period marked by greater awareness of environmental and landscape concerns, as well as within the context of a renewed urban planning vision focused on sustainable spatial management. In contrast, the airport area experienced logistical developments much earlier, within a broader framework that included industrial zones, at a time when socioeconomic paradigms were significantly different from today.

Logistics functions usually tend to form clusters, but the two cases presented here were selected for their distinct reasons for agglomeration. The Cluster Aeroporto, strategically located near the A4 motorway – a key section of two major European routes, the E55 and E70, crucial for continental connections – and to one of Italy's primary airports in terms of freight handling, focuses on both continental and intercontinental traffic while maintaining strong ties with local companies. In contrast, the Cluster Brebemi is more detached from the local business network, prioritizing and servicing long-range routes, and this can also be seen in the differentiation of the types of logistics established.

### 1.1. Body

In recent decades, rural areas have undergone significant changes due to evolving consumption habits and lifestyles, leading to urban expansion and new forms of urbanization. This has highlighted the need to differentiate between urban and non-urban spaces, with a focus on defining "rural" areas. Current views challenge the traditional urban-rural divide, recognizing these peri-urban areas as "operational landscapes" [2,3] that provide essential services like resource extraction, energy supply, waste management, and logistics, despite not fitting typical urban definitions.

Since the 1980s, the traditional conception of "logistics" has undergone significant transformation due to industrial decentralization and the global division of labor, which has diminished the importance of local production in favor of a globally interconnected network of logistics nodes [4]. Today, logistics encompasses a complex system that manages the production, storage, and transportation of goods on a global scale [5], and that relies heavily on integrated and efficient mobility infrastructures.

The logistics system is structured around mobility infrastructure, logistics nodes such as ports and airports, and goods distribution and management activities, including e-commerce and reverse logistics technologies [6]. This system plays a crucial role in enhancing territorial competitiveness, which is often linked to the logistical attractiveness of a region [7].

Moreover, the expansion of logistics activities presents significant environmental and landscape challenges. Logistics sprawl, particularly in suburban areas, has led to issues such as soil sealing and increased traffic-related pollution. Therefore, a balanced approach to spatial planning that integrates the needs of the logistics sector with environmental and social considerations is essential. Today, logistics can be viewed in a broader context, incorporating services such as goods recycling and other activities that provide environmental benefits [8].

Last-mile logistics, driven by the rise of e-commerce, significantly contributes to urban pollution through increased traffic and CO<sup>2</sup> emissions in city centers. This underscores the growing complexity of logistics and its impact on urban life.

The examination of this topic within the context of the Province of Bergamo has revealed that, despite decades of rapid growth and evolution, the logistics sector faces a significant regulatory gap. This gap exists both in legislation and in urban and territorial planning instruments across all administrative levels, even though the Lombardy Region has recently enacted a law regulating logistics settlements of supra-municipal importance [9]. The location decisions of logistics infrastructures are influenced by municipal choices regarding territorial planning, determining where these facilities can be situated. Each type of logistics infrastructure has specific requirements based on the activities it supports. As logistics infrastructures play a key role in contemporary suburban areas, the decisions made by urban planners will significantly shape the future economic and social geographies of the territory [10].

Given this regulatory void, it is essential to begin with an analysis of existing conditions. The foundation for this study is a report by the Centro Studi sul Territorio (CST) 'Lelio Pagani' of the University of Bergamo [11], which aims to establish a comprehensive framework of knowledge on the logistics system in the Bergamo provincial area.

## 2. Materials and methods

The methodology employed in this study to analyse logistics and related topics is based on a multidisciplinary approach. Initially, scientific literature review was conducted to familiarize with existing theories and studies on the subject. A foundational database was compiled by data from the above-mentioned report by CST, complemented during an internship at the Territorial Planning and Urban Planning Service of the Province of Bergamo.

To construct a regulatory framework and understand the relevant urban and territorial planning instruments, databases of the Lombardy Region’s laws, the Gazzetta Ufficiale of the Italian Republic, and the Official Journal of the European Union were utilized. Furthermore, the Metropolitan Territorial Plan of the Metropolitan City of Milan and the Regole di Piano (Planning Rules) of the Provincial Coordination Territorial Plan of the Province of Bergamo were reviewed.

In addition to this initial data, the study was further developed through detailed cartographic analyses performed using GIS, with databases sourced from the of the Lombardy Region Geoportale. Field surveys were also conducted in the areas under investigation to identify issues related to the integration of different functions and assess the quality of structures. Additionally, dimensional parameters of logistics buildings were recorded, contributing to a hierarchical analysis of spatial dimensions.

### 3. Results

Logistics geographies in the Province of Bergamo have been categorized by type (Figures 1, 2, and Table 1). Of the 1,016 logistics units, the majority are freight forwarders and hauliers (733 units, 72.1%). Other categories include 164 third-party logistics platforms and warehouses (16.1%), 77 distribution centers (7.6%), 27 postal operators (2.7%), and 15 couriers (1.5%).

In the “Aeroporto” and “Brebemi” clusters, while freight forwarders and hauliers remain dominant (32 units or 57.1% in Aeroporto; 91 units or 69.5% in Brebemi), there are notable differences. The Cluster Aeroporto has a significant number of courier and postal operators, benefiting from proximity to the airport. Conversely, the Cluster Brebemi, situated in a more agricultural area of the upper Po Plain, features a higher concentration of distribution centers, reflecting its more dispersed and less congested space compared to the historically industrialized Cluster Aeroporto.

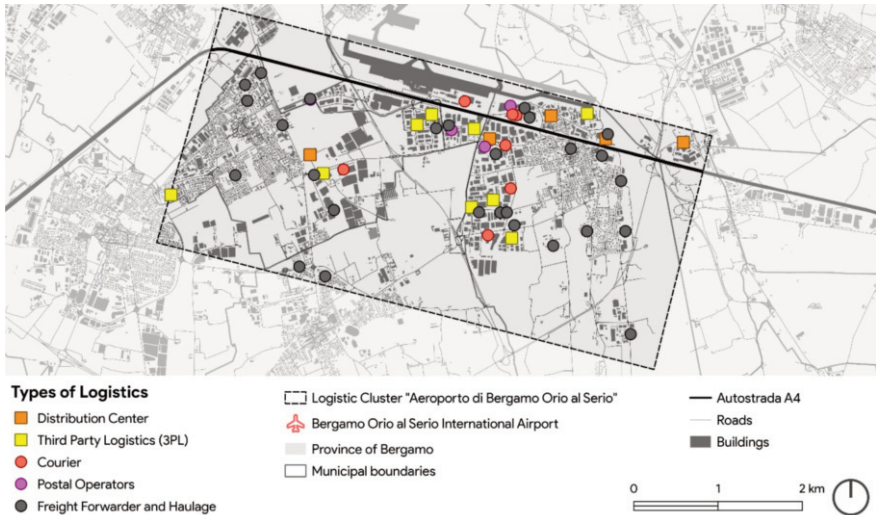


Figure 1. Types of Logistics in Logistic Cluster “Aeroporto di Bergamo-Orio al Serio”

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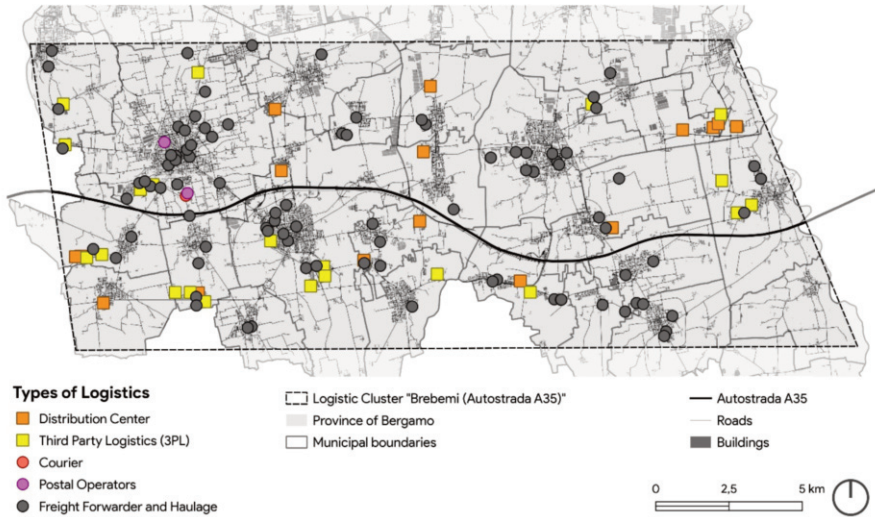


Figure 2. Types of Logistics in Logistic Cluster "Aeroporto di Bergamo-Orio al Serio"

	PROVINCE OF BERGAMO		CLUSTER AEROPORTO		CLUSTER BREBEMI	
	Units	%	Units	%	Units	%
<b>DISTRIBUTION CENTER</b>	77	7,6 %	4	7,1%	16	12,2%
<b>THIRD PARTY LOGISTICS</b>	164	16,1%	9	16,2%	21	16%
<b>COURIER</b>	15	1,5%	7	12,5%	1	0,8%
<b>POSTAL OPERATORS</b>	27	2,7%	4	7,1%	2	1,5%
<b>FREIGHT FORWARDER &amp; HAULAGE</b>	733	72,1%	32	57,1%	91	69,5%
<b>TOTALE</b>	<b>1.016</b>	<b>100%</b>	<b>56</b>	<b>100%</b>	<b>131</b>	<b>100%</b>

Table 1. Number of units of the different types of logistics in the Province of Bergamo and in the clusters Aeroporto and Brebemi..

To better define the territorial framework and assess the impacts of logistics expansion, the land use of the study areas was analysed using the most recent version of the DUSAF database from the Lombardy Region, updated to 2021 (Figures 3, 4, 5).

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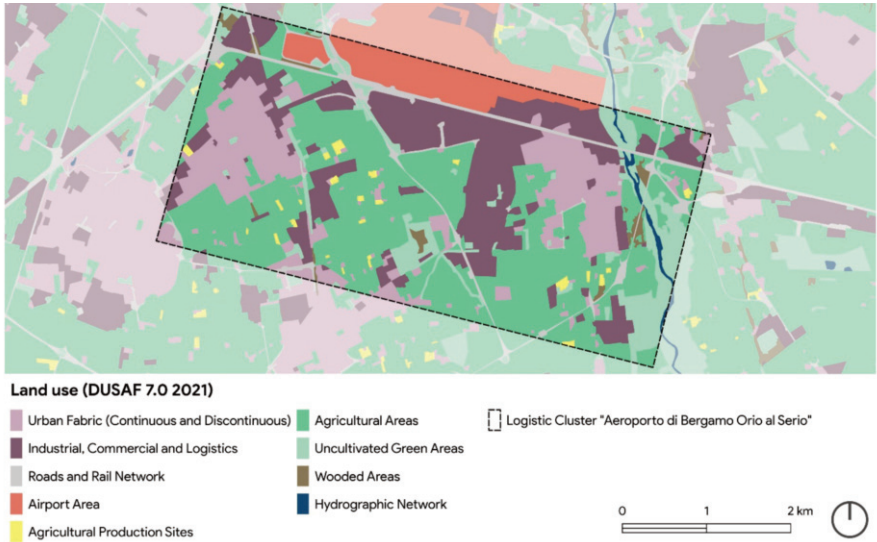


Figure 3. Land Use in Cluster Aeroporto

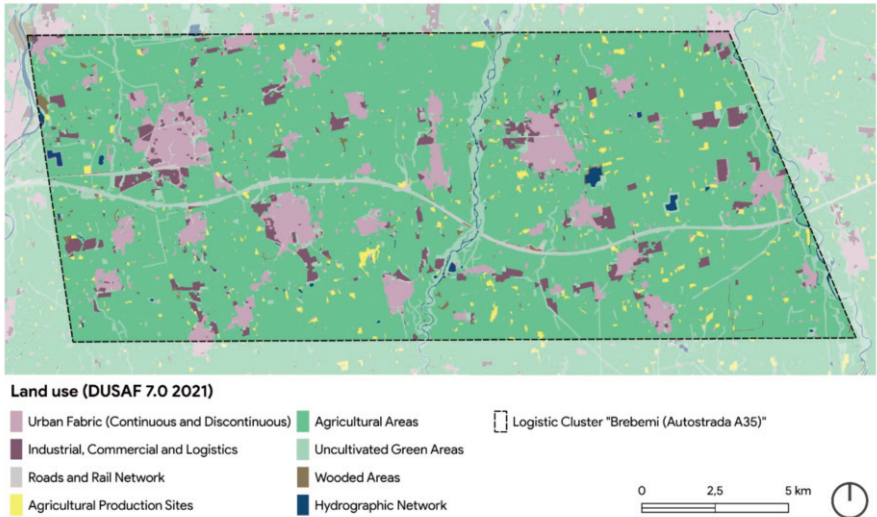


Figure 4. Land Use in Cluster Brebemi

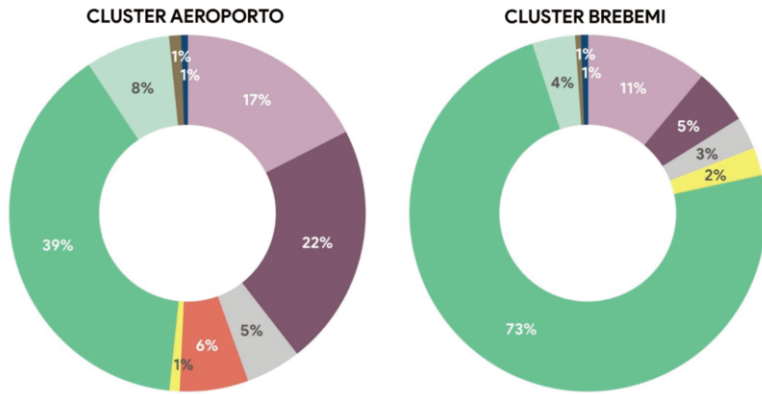


Figure 5. Charts showing land use percentage in the two clusters.

Direct comparison between the two clusters is challenging due to significant differences. However, there is a notable variation in the proportion of green areas (both cultivated and uncultivated) relative to industrial, commercial, and logistics areas, which highlights their locational distinctions. Historical analysis shows an expansion of "purple" areas from 1990, when the A35 motorway project was initiated, through 2015, a year after its operation began, with this expansion continuing to the present.

Additionally, an analysis classifies logistics settlements based on the size of their operational buildings. This hierarchical analysis aims to provide a comprehensive understanding of the significance and functionality of logistics structures according to their scale, offering insights into logistics organization and its territorial impact. The size of the buildings is a crucial indicator for differentiating between various logistics types, such as large-scale platforms and last-mile logistics.

#### 4. Conclusions

Extending this analysis to encompass all logistics clusters within the Lombardy Region could significantly contribute to the knowledge base required to support the new regional legislation on logistics settlements of supra-municipal importance. Specifically, Article 1, paragraph 5, and Article 3, paragraph 1, letter h of the law, emphasize the need for Provinces and Metropolitan City of Milan to provide and update a comprehensive knowledge framework to define suitable areas for logistics location. This analytical approach would not only support the effective application of these legal provisions but would also facilitate the strategic identification of key areas for logistics development. This would ultimately strengthen regional planning efforts, promoting informed decision-making that addresses both current logistical demands and future growth opportunities.

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