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Contaminated sites and environmental justice in Italy. When space as proximity is not enough

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Contaminated sites and environmental justice in Italy. When space as proximity is not enough

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Introduction

1 Over the past two decades, Environmental Justice (EJ) scholarship has undergone a profound conceptual and methodological evolution, as the many disciplines that have engaged with it have broadened the topics of interest, analytical lenses, and constitutive concepts. Early EJ research, largely developed in the United States, emphasised distributive analyses based on *proximity* to environmental hazards to demonstrate disproportionate exposure among socially marginalised groups (Bullard, 1990; Mohai & Saha, 2006). While this distributive focus has played a crucial role in providing empirical evidence of inequalities, it has increasingly been questioned for its limited capacity to account for historical, political, and relational processes through which environmental injustices are produced and sustained (Pulido, 1996; Holifield, 2001). EJ has also been conceptualised as a multidimensional and dynamic phenomenon (Schlosberg, 2007; Holifield *et al.,* 2017). As acknowledged by Svarstad and Benjaminsen (2020), a range of complementary perspectives have been converging into a more consolidated framework: justice as vulnerability, which recognises that environmental harms are unevenly experienced and that social groups differ in exposure, sensitivity, and capacity to recover; justice as responsibility, which highlights questions of causation, accountability, and repair; justice as recognition, understood as respect for different identities, values, and principles; justice as participation, concerning meaningful access to decision-making for affected communities; and the capability approach, which links justice to individuals' and communities' ability to fully express their potential.

2 Within this framework, Walker's (2009) contribution represents a spatial–relational refinement of EJ, reworking these dimensions as spatial relations rather than abstract categories, and drawing attention to the *multiple spatialities* through which injustice is produced and experienced. Rather than conceiving space as a Cartesian and passive container in which unequal distributions of environmental harm occur, this perspective recognises space as an active and constitutive dimension of injustice (Walker, 2009; Holifield *et al.*, 2010). From this standpoint, environmental injustice cannot be reduced to spatial coincidence alone but must be understood as a relational process produced through interactions between places, actors, and socio-ecological dynamics. This reconceptualization of space also foregrounds the importance of *scale* as a core analytical concern: EJ dynamics are increasingly understood as multi-scalar processes, in which localised exposures and lived experiences are shaped by decisions and responsibilities operating at metropolitan, national, and transnational levels (Walker, 2009; Debbané & Keil, 2004). Examining how environmental harms, benefits, and responsibilities are distributed and displaced across geographical scales is therefore essential to understanding the production and reproduction of localised forms of environmental injustice.

3 Alongside this spatial reworking, more explicitly critical EJ perspectives have emerged that question the assumptions and limits of "mainstream" EJ (Menton *et al.*, 2020). Drawing on political ecology, critical race theory, and decolonial thought, this scholarship situates environmental injustice within broader structures of power, political economy, and historical domination, emphasising how racialised, colonial, and capitalist processes systematically organise environmental harm and vulnerability across space and time (Pellow, 2016; Pulido & De Lara, 2018).

4 By embracing the idea that the complexity and diversity of the EJ framework constitute a strength and a powerful tool for investigating society–nature relations (Holifield *et al.*, 2010; Sze & London, 2008), this paper advances a spatially informed and multi-scalar analysis of EJ in Italy, focusing on contaminated sites that have been formally institutionalised as Sites of National Interest (SNIs). We adopt a sequential and analytically complementary research strategy. First, a national-scale exploration of SNIs examines EJ through a distributive lens, building on previous quantitative analyses conducted by the authors (Gemmiti *et al.*, 2025). By operationalising space in terms of the spatial coincidence of environmental exposure and socio-demographic disadvantage, this step identifies broad patterns while also exposing the analytical constraints of proximity-based approaches. The second part develops a qualitative, place-based analysis of the "Napoli Orientale" SNI, showing how historical trajectories, institutional decisions, and multi-scalar relations shape the production and perpetuation of environmental injustice. Together, these two analytical moments generate interpretive insights into the multiple spatialities through which injustice is produced and reproduced.

Environmental justice in Italy: trajectories and research gaps

5 In Italy, the concept of EJ arrived relatively late (around the early 2000s), having long been overshadowed by conservationist and heritage-oriented environmentalism that prioritised landscape and nature protection over social concerns (Rosignoli, 2018,

2020). Its dissemination was driven primarily by civil society organisations and activist networks, most notably A Sud, which played a key role in introducing the EJ framework into public discourse and environmental struggles (CDCA, 2019; Ruocco & Stori, 2016).

6 Italian studies remain relatively limited and strongly interdisciplinary. Within both activism and scholarship, EJ has often been addressed under the categories of environmental conflicts concerning unwelcome facilities and environmental crimes, even when not explicitly framed within the vocabulary of EJ (e.g., Pellizzoni, 2011; Avallone, 2015; De Rosa, 2018).

7 Quantitative studies have documented overlaps between contamination, socio-economic deprivation, and adverse health outcomes, particularly in relation to industrial pollution, waste management, and contaminated sites (e.g., Bernardini-Papalia & Scognamiglio, 2023; Pasetto *et al.*, 2022; Germani *et al.*, 2022; 2014). Notably, the SENTIERI programme has played a central role in bringing distributive environmental injustice into the field of health impact assessment, documenting a marked North–South gradient of socio-environmental disadvantage and mortality risk associated with contaminated sites (Zona *et al.*, 2023). Meanwhile, a rich body of qualitative research has emphasized the social, cultural, and embodied dimensions of injustice, privileging place-based case studies and historical inquiry (e.g., Armiero & D'Alisa, 2012; Barca & Leonardi, 2016; Falcone *et al.*, 2020; Iengo, 2022).

8 Overall, Italian EJ scholarship reflects broader asymmetries in the international field, which remains heavily skewed towards high-income countries (particularly the United States, the United Kingdom, Canada, and Australia) where long-standing EJ movements and robust data infrastructures have tended to support spatially-focused quantitative analysis (Althor & Witt, 2020).

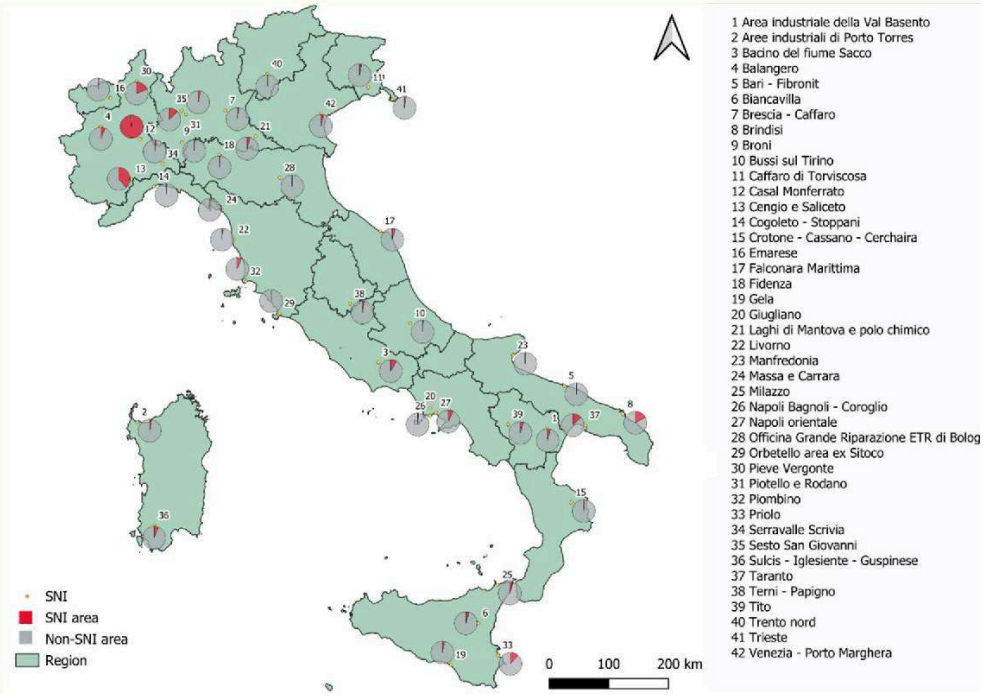
9 In the Italian context, this has resulted in a relative lack of integrated, multi-scalar, and relational approaches capable of linking distributive patterns to the historical, institutional, and spatial processes through which environmental injustice is generated. This paper seeks to contribute to filling this gap by integrating quantitative analysis with a relational and multi-scalar interpretation of EJ, using contaminated sites as a lens through which to view the subject beyond a base of proximity and to accentuate the processes that produce and reproduce injustice across space and time.

Environmental justice as proximity: a quantitative perspective on Italian contaminated sites

10 Sites of National Interest (SNIs) constitute the most formalised and institutionally recognised geography of environmental contamination in Italy, making them particularly suitable for proximity-based analysis. Established through national legislation[1], SNIs identify areas affected by severe and long-lasting contamination of soils, surface waters and groundwater, primarily linked to industrial activities. Populations residing within and around these areas experience high rates of specific diseases and excess mortality associated with environmental exposure, as documented by the national SENTIERI epidemiological programme coordinated by the Italian National Institute of Health (Zona *et al.*, 2023). Currently, Italy has 42 SNIs, covering approximately 170,000 hectares (0.57% of the national territory) and 77,000 hectares of marine areas, distributed along the entire peninsula and major islands. These sites

encompass 233 municipalities, with a resident population of approximately 270,000 inhabitants, although their spatial configurations vary considerably. Some SNIs correspond to extensive, multi-municipal territories (e.g. 'Casale Monferrato' in Piedmont), while others are located within a single municipality, sometimes coinciding with a single industrial plant (e.g. 'Officina Grande Riparazione ETR' in Bologna). This heterogeneity makes SNIs both analytically important and methodologically challenging.

Figure 1. Location of Italian Sites of National Interest (SNIs) and areas of analysis.



In red the surface included within the SNIs perimeters, in grey the remaining municipal surface of the municipalities intersected by the perimeter. Numbers correspond to the SNI names listed in the legend.

11 Previous research conducted by the authors (Gemmiti *et al.*, 2025) explored EJ in Italy through a spatial coincidence approach (in line with the framework by Chakraborty, 2018; Mohai & Saha, 2006), examining whether socially disadvantaged populations were disproportionately located within SNI perimeters. A key innovation of that work was the use of census tract-level data[2], allowing for a much finer spatial resolution, which reduced the aggregation bias associated with municipal-level analysis. This approach made it possible to compare socio-demographic characteristics of populations living inside the official SNI perimeters ("SNI areas") with those living in the remaining portions of the same municipalities ("non-SNI areas"). To capture socio-demographic vulnerability and facilitate a comparative assessment, a composite indicator was constructed using the Mazziotta-Pareto Index (MPI) approach (Mazziotta & Pareto, 2016). For a comprehensive account of the methodological approach and full statistical results, readers are referred to Gemmiti *et al.* (2025), where the quantitative analysis is presented in detail. A summary of the methodology and results is also provided in the Appendix.

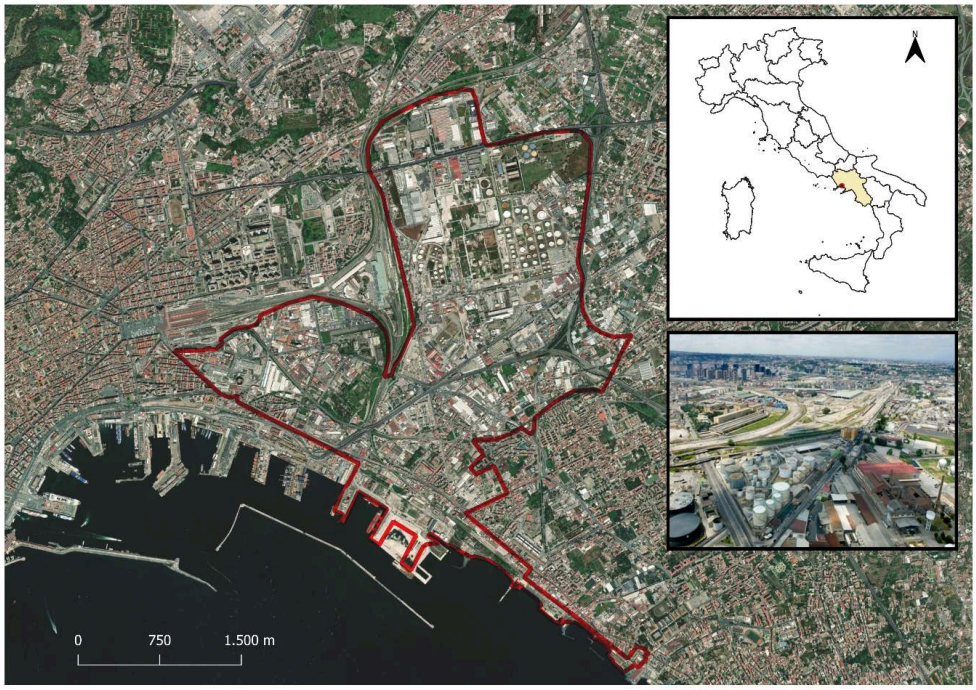
12 The analysis revealed that, in most cases, populations residing within SNI perimeters display higher levels of socio-demographic disadvantage than those living in non-SNI areas of the same municipalities. At this scale, the spatial coincidence of proximity to contamination and social vulnerability appears consistent with the classical distributive framework of EJ. However, a closer examination of the data reveals several analytical limits of a purely proximity-based interpretation. First, no linear geographic pattern emerged: elevated levels of socio-demographic vulnerability were found both in economically dynamic northern regions, and in structurally disadvantaged southern regions, which challenges the traditional North–South gradient that has been identified in previous municipal-scale studies (Pasetto *et al.*, 2022). Second, the internal composition of socio-demographic disadvantage varies significantly across sites: in some contexts, elevated composite scores are primarily associated with unemployment, whereas in others they reflect low educational attainment or certain demographic structures. Third, the relationship between proximity and vulnerability is not uniform: in sites with relatively low composite scores such as small, sparsely populated, or economically specialised areas, the difference between SNI and non-SNI areas becomes less pronounced or even reversed. This heterogeneity reflects the markedly diverse geographical, historical, socio-economic and productive trajectories of Italian SNIs (Scognamiglio, forthcoming 2026).

13 These findings do not invalidate the distributive dimension of EJ. Rather, they expose its limitations when treated as a self-sufficient framework, and underscore the need for a relational, multi-scalar, and historically grounded interpretation that connects distributive patterns to the institutional, political-economic, and scalar processes shaping the production and reproduction of environmental injustice at a local level. The ‘Napoli Orientale’ SNI, in the South of Italy, offers a compelling case study for such an in-depth examination. Situated within a dense metropolitan context, where long-standing industrial contamination overlaps with working-class residential neighbourhoods, socio-economic marginalisation, and ongoing energy and logistics infrastructures, it provides an analytically rich setting in which to move beyond proximity and explore the multiple spatialities of environmental injustice.

From proximity to multiple spatialities: the case of Napoli Orientale

14 The qualitative insights presented here for the ‘Napoli Orientale’ SNI (Fig. 2) draw on three years of field-based research (Scognamiglio, 2026), which included participant observation and a systematic analysis of academic, institutional, and grassroots-produced secondary sources. While not intended as an exhaustive ethnographic study, this strategy allows for an evidence-based interpretation of how environmental injustice has been produced, normalised, and contested over time.

Figure 2. “Napoli Orientale” SNI (red boundary) on satellite imagery, indicating location within Italy and the Campania region.



15 Napoli Orientale (literally: East Naples) is in Naples, the capital of the Campania region of southern Italy, one of the most densely populated metropolitan areas in Europe. Declared as an SNI in 1998, it covers 826 ha of land and 448 ha of marine area, and is contaminated by heavy metals, hydrocarbons, and chlorinated organic compounds inherited from past industrial activities. Here, the distributive patterns identified in quantitative analysis at the national scale reveal multiple and intersecting dimensions of vulnerability. Socio-demographic disadvantage is very high: 64% of residents have a low educational attainment, 59% are unemployed or inactive and the population average is among the youngest in Italy, with a relatively high share of children and a low proportion of elderly residents (Table 1). Although systematic health data at the neighbourhood scale remain limited, local epidemiological surveys report mortality rates up to 17% above the city average, and elevated cancer incidence, pointing to long-term exposure risks and accumulated health inequalities (Fierro *et al.*, 2022). This spatial polarisation suggests the coexistence of markedly different social and health profiles within the same city, embedded within a metropolitan and regional context already characterised by cumulative and structural disadvantage[3].

Table 1. Socio-demographic disadvantage in the SNI "Napoli Orientale": national ranking and key elementary indicators.

Indicator	Value
Composite indicator of socio-demographic disadvantage	110.1 (3rd highest value among all SNIs)
Children	15.4%
Elderly	18.4%
Foreigners	9.4%
Low education (ISCED Level 2 or below)	64.0%
Non-employed	59.0%

Source: Authors' elaboration based on Gemmiti *et al*. (2025).

16 These distributive patterns, however, cannot be understood independently of the historical and institutional processes that have shaped this territory. The SNI designation formalised a condition of environmental degradation that had been created over decades through the concentration of industrial and energy-related activities. From the late 19th century, the eastern part of the city, originally a rural hinterland, was progressively designated for industrial development, primarily manufacturing, mechanical, and petrochemical (Caruso, 2020). This trajectory intensified in the late 1920s and 1930s, when the area became increasingly treated as a space of extra-territorial management, governed by industrial priorities rather than ordinary urban planning and social considerations (Parisi, 2001). Concurrently, uncontrolled urban expansion brought residential areas, particularly working-class neighbourhoods, into close proximity with industrial areas, exposing the population to serious health risks (Caruso, 2019; Di Biagi, 2001). The deindustrialization of the 1970s-1980s triggered factory closures, unemployment, and urban decline (Caruso, 2019), taking the form of a 'noxious deindustrialization' that left behind long-term socio-ecological harm (Feltrin *et al*., 2022). Despite its industrial decline, Napoli Orientale retains a strategic role in metropolitan and national energy geographies. Today, it functions as a critical zone containing oil storage facilities, logistics terminals, and residual industrial plants, which are largely managed by multinational companies. In this sense, Napoli Orientale is simultaneously a 'hub' within national and global economic networks and a 'marginal' area in terms of social well-being (Massey, 2004).

17 Institutional decisions taken at multiple scales (local, metropolitan, regional, and national) have played a decisive role in producing and reproducing this condition, transforming environmental exposure into a structural and 'institutionalised' feature. Crucially, strategic decisions are largely taken in distant centres of political and economic power, generating a scalar disconnection that constrains the political participation and limits communities' capacity to challenge dominant systems of authority (Leitner *et al*., 2008). In this sense, Napoli Orientale has been historically positioned as a space for the extraction, transformation, and circulation of resources,

where environmental costs remain local while economic and functional benefits are displaced towards national and global markets, and other parts of the metropolitan area.

Figure 3. Napoli-Levante combined-cycle power plant within the Site of National Interest "Napoli Orientale." The scene illustrates the everyday coexistence of industrial facilities and urban life.

Source: Maione G., https://www.flegreaphoto.it/ (accessed March 26, 2025).

18 This dynamic exemplifies what Walker (2009, p. 623) defines as "disconnected geographies of responsibility and outcome," and is particularly evident in the concentration of critical energy infrastructures. This area hosts a major oil terminal managed by Kuwait Petroleum Italia, one of the most important energy supply hubs in Southern Italy, handling approximately 3 million tons of petroleum products per year[4]. From the dock, a network of oil and gas pipelines - operated by multinational companies including Eni, Kupit, and Sonatrach - extends inland for over 4 km, connecting coastal unloading points to storage tanks, with a high risk of accidents[5]. The Napoli-Levante thermoelectric power plant (Fig. 3) further exemplifies this configuration. Historically coal- and oil-fired, the site contributed to long-term environmental degradation and exposure in adjacent residential neighbourhoods (Iannello & Morreale, 2006; Ammendola & Morreale, 2012). In 2009, the plant was converted into a 400 MW combined-cycle gas turbine facility, despite existing zoning provisions that called for the plant's closure, remediation and alternative land uses (Ammendola & Morreale, 2012). It is currently operated by Tirreno Power, one of the Italy's main electricity producers. While electricity is fed into the national grid, only a marginal share is destined for local consumption, in a city with one of the lowest per capita electricity consumption rates in the country (ISTAT, 2020). This functional decoupling of production and consumption sites is mirrored by a governance structure in which decision-making authority is distributed across national and transnational corporate scales[6], while environmental burdens remain territorially fixed.

19 Environmental injustice in Napoli Orientale is also sustained through processes of symbolic and institutional misrecognition. Over time, the rhetoric of contamination has contributed to framing this area as a 'natural' destination for the further placement of environmental burdens and extractive projects (Walker, 2009; Pellow, 2004). This misrecognition has weakened claims for remediation, care, and alternative land uses, contributing to what can be described as a condition of 'recognition without repair' (Scognamiglio, 2026), in which formal acknowledgment of contamination has not translated into environmental or social recovery. The persistence of oil storage facilities (despite regulatory plans calling for their relocation) and recent proposals such as the liquefied natural gas (LNG) storage facility and the expansion of port activities[7], exemplify how private economic interests continue to find space and legitimacy, the well-being of residents remains overlooked.

20 As documented through sustained engagement with local actors, these dynamics are also intertwined with the systematic exclusion of local communities from decision-making processes (Bell & Carrick, 2017). Although Italian environmental law formally recognises diffuse interests and provides mechanisms for public observation, participation in key arenas has largely remained formal or consultative, with decisions concentrated in institutional and corporate hands. This has limited the ability of local communities to influence decisions or redirect development trajectories. At the same time, these spatial arrangements are neither fixed nor uncontested. Grassroots associations and neighbourhood committees (e.g. *Comitato di San Giovanni a Teduccio, Barra R-Esiste, Stop GNL*), alongside national environmental networks (e.g. *WWF, Italia Nostra, Medicina Democratica*) have mobilised through public assemblies, campaigns, legal action, and citizen-led monitoring, thereby constructing alternative spaces of participation, visibility and knowledge production (Caruso *et al*., 2025; Scognamiglio, 2026). This was most evident in the opposition to the proposed LNG facility, where a broad coalition coordinated by the *Stop GNL* network contributed to the project's suspension in 2023, and in the establishment of the *Consulta Popolare per la Salute e la Sanità della Città di Napoli* (2018) through which *Medicina Democratica* and local actors pressured institutions to release previously inaccessible health data.

Conclusions

21 This paper examined environmental justice in Italy through the lens of contaminated sites institutionalised as Sites of National Interest (SNIs) by combining a national-scale proximity-based analysis with a qualitative, place-based investigation of Napoli Orientale.

22 At the national scale, socio-demographic disadvantage generally coincides with proximity to contamination: populations residing within SNI perimeters tend to exhibit higher vulnerability than those living in the remaining portions of the same municipalities. This confirms the relevance of distributive approaches in identifying broad patterns of environmental inequality and aligns the Italian case with broader European patterns. However, the analysis also demonstrates that proximity-based approaches are analytically insufficient when treated as self-contained explanations. The heterogeneity observed across SNIs in terms of geographical configuration and socio-demographic structure shows that environmental injustice in Italy does not follow a uniform territorial logic. Distributive patterns are evident, but should be

interpreted relationally and historically (Holifield, 2001; Walker, 2009), through the trajectories of industrial development, governance arrangements, and scalar configurations that structure contaminated sites.

23 The case of Napoli Orientale exemplifies how environmental injustice operates through intertwined spatialities of vulnerability, production, responsibility, recognition, and participation, revealing the relational processes that sustain contaminated sites beyond proximity alone.

24 Taken together, the findings highlight the need for analytically complementary approaches: proximity-based analysis identifies broad distributive inequalities, but a multi-scalar and place-based reading is required to explain how they are produced, sustained, experienced and contested. Environmental injustice thus appears not merely as uneven distribution, but as a dynamic configuration of spatial relations linking production, vulnerability, responsibility, recognition, and participation (Schlosberg 2007; Walker, 2009).

25 By providing spatially grounded evidence from Italy, a context still underrepresented in international EJ scholarship, this paper contributes to ongoing European debates on EJ, socio-environmental inequality, and contaminated sites. More broadly, it responds to calls within EJ research for integrative approaches capable of bridging quantitative mapping with relational interpretation.

26 Future research may build on these insights by developing more systematic comparisons across contaminated sites with similar socio-spatial and institutional characteristics, moving beyond individual case studies. Greater attention to longitudinal dynamics would help trace how contaminated sites evolve over time, and how policy reforms, remediation processes, and social mobilisation reshape, or reproduce, configurations of environmental injustice. Extending the perspective across European contexts may further illuminate how different industrial legacies and governance arrangements shape distinct geographies of contamination and injustice.

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APPENDIXES

Appendix A. National-scale quantitative analysis: data, method and main results

A1. Data sources and the construction of the composite indicator

Given the absence of a harmonised national geospatial registry of SNIs, an original GIS database was constructed (updated to March 2023). SNI perimeters were digitised from official regulatory documents when georeferenced shapefiles were not available. Socio-demographic data were drawn from the 2021 Italian Population Census at the census tract level. Eight indicators were selected to capture multidimensional socio-demographic disadvantage, drawing on environmental justice literature and Italian deprivation frameworks. These include: Child-woman ratio (children 0-4/women 15-44); Children (ages 0–14); Elderly (age 65+); Foreign children; Foreigners; Large households (more than 5 members); Low educational attainment (ISCED Level 2 or below); Non-employed (unemployed or inactive population aged 15–64).

A composite indicator of socio-demographic disadvantage was constructed using the Mazziotta–Pareto Index (MPI) methodology (Mazziotta & Pareto, 2016). The MPI is a non-compensatory index based on:

• Standardisation of elementary indicators (z-scores);

• Aggregation through arithmetic mean;

• Application of a penalty coefficient reflecting horizontal variability across dimensions.

The MPI for each territorial unit is obtained using the formula:

$$MPI_i = M_{zi})M_{zi} + S_{zi}cv_{zi}\ ;\ cv_{zi} = \frac{S_{zi}}{M_{zi}}$$

where, M_{zi} is the mean of normalized values, S_{zi} is the standard deviation, and cv_{zi} is the coefficient of variation of normalized values for each unit I, providing a measure of relative data dispersion around their mean. The penalty coefficient $+ S_{zi}cv_{zi}$ adjusts the mean of standardized indicators upwards, thereby producing index values above the arithmetic mean, with greater variations occurring in units with heterogeneous socio-demographic fragility across various dimensions. The index captures both the average level of disadvantage and the degree of internal heterogeneity across socio-demographic components, reducing compensatory effects between indicators.

A.2. Summary of main results

Figure A1. Classification of sociodemographic disadvantage differences between SNIs and non-SNIs.

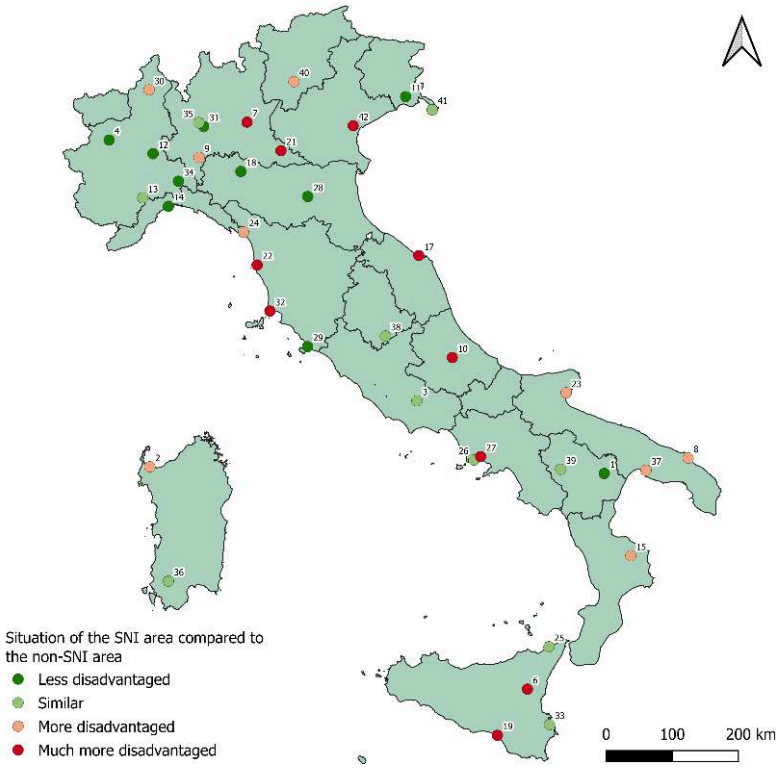

Table A1. Elementary indicators (transformed) and composite indicator of socio-demographic disadvantage for SNI areas. Higher values of the indicator indicate a higher level of socio-demographic disadvantage.

ID	Child-woman ratio	Children	Elderly	Foreigners	Foreign children	Large House-holds	Low education	Non-em-ployed	MPI
Biancavilla	107.6	113.9	91.6	91.3	116.7	119.7	118.7	121.8	111.4
Gela	125.0	92.1	83.9	133.7	100.6	91.0	117.2	120.9	110.8
Napoli Orientale	106.8	110.0	90.0	99.5	104.7	122.5	119.7	119.6	110.1
Laghi Mantova	112.5	111.1	91.0	116.9	118.4	113.8	108.7	97.5	109.5
Brescia Caffaro	114.0	113.0	89.1	129.5	110.3	107.9	103.2	93.1	108.8
Venezia Porto Marghera	104.8	115.6	66.7	139.4	100.0	108.8	100.7	99.2	107.8

Broni	110.6	102.0	103.8	120.2	121.7	102.1	101.0	92.6	107.6
Manfredonia	114.3	132.3	73.0	91.2	89.1	116.6	102.1	105.5	105.9
Crotone Cassato Cerchiara	109.7	116.0	82.0	93.4	96.4	114.6	107.6	115.3	105.7
Falconara Marittima	109.4	108.5	96.2	111.4	107.2	102.9	106.4	98.4	105.3
Livorno	112.2	109.1	103.4	98.7	104.5	100.5	114.5	94.4	105.1
Bussi sul Tirino	112.3	99.9	105.3	94.9	112.7	103.2	105.2	104.3	105.0
Napoli Bagnoli	109.2	106.0	96.1	92.3	104.1	110.2	102.0	114.0	104.7
Taranto	97.7	106.9	90.6	92.7	91.3	108.0	118.9	116.4	103.9
Piombino	100.9	99.3	98.6	108.8	104.1	101.1	108.7	100.5	102.9
Brindisi	104.0	105.6	91.1	95.2	91.1	106.0	112.1	112.2	102.8
Pioltello-Rodano	125.3	132.6	71.2	102.3	95.4	100.2	84.7	76.9	102.8
Massa e Carrara	102.7	94.5	100.2	104.3	108.6	94.7	106.6	101.2	101.8
Milazzo	96.8	99.2	99.8	92.9	102.2	101.7	104.0	109.2	100.9
Trento nord	106.9	105.1	91.9	114.9	104.9	102.8	82.6	89.6	100.8
Cengio e Saliceto	99.4	90.9	115.9	101.3	103.4	93.4	105.0	91.5	100.7
Priolo	102.2	105.9	94.3	93.0	93.4	103.2	97.9	111.0	100.5
Tito	106.9	122.3	82.2	92.4	100.9	100.8	92.3	95.0	100.3
Sesto San Giovanni	103.4	103.3	94.5	108.6	110.3	95.2	90.8	88.0	99.8
Pieve Vergonte	97.3	90.8	112.1	93.7	98.5	89.9	112.1	98.1	99.7
Fidenza	101.9	96.2	101.2	98.0	105.7	105.7	94.3	91.4	99.5
Porto Torres	95.5	92.8	105.7	93.1	79.7	89.4	117.3	111.4	99.5
Terni	96.4	97.5	98.4	108.1	102.7	97.7	95.2	98.4	99.5

Bacino fiume Sacco	96.4	98.9	98.7	96.4	101.8	101.6	97.5	101.5	99.1
Casal Monferrato	95.3	91.4	109.6	98.9	104.5	93.7	100.4	94.8	98.9
Sulcis Iglesiente Guspinese	93.0	92.0	104.4	90.4	85.0	92.4	116.0	107.0	98.5
Trieste	101.6	92.4	113.3	96.0	87.0	90.6	102.1	91.3	97.4
Serravalle Scrivia	84.1	100.9	108.9	96.5	83.4	99.1	102.0	93.3	96.7
Caffaro di Torviscosa	68.3	83.3	113.6	104.7	102.4	91.2	103.3	87.5	96.2
Balangero	89.3	94.3	121.0	90.0	73.0	84.6	107.7	89.7	95.7
Cogoleto - Stoppani	93.5	94.9	111.9	92.5	97.0	91.2	79.2	91.1	94.7
Val Basento	68.0	90.1	93.7	100.4	87.7	94.5	102.7	104.3	93.9
ETR_Bologna	108.7	79.2	89.2	92.5	108.3	89.5	65.4	89.3	92.2
Orbetello	86.7	89.9	100.8	93.7	80.1	88.6	88.1	98.3	91.2

Source: Gemmiti *et al.*, 2025

NOTES

1. The first identification was proposed in Legislative Decree 22/1997. Several other laws followed that revised the number and, in some cases, the extent of the areas.

2. Italian census tracts are the smallest statistical units used by ISTAT for population data dissemination. Their size varies according to settlement density, ranging from small urban blocks to several square kilometres in rural areas, thus allowing a fine-grained intra-municipal analysis.

3. Structural socio-economic disadvantage in Campania, and particularly in the metropolitan area of Naples, is documented by national and European indicators. According to ISTAT (2024), the region performs persistently below the national average across key well-being dimensions, including employment, income, education, health, and access to essential services. At the European scale, Campania ranks among the regions with the highest risk of poverty or social exclusion, with a rate more than twice the EU average. See: ISTAT (2024), *Il benessere equo e sostenibile dei territori: Campania* (BesT 2024); Eurostat (2025), *Living conditions statistics at regional level. Statistics Explained*.

4. The products are imported from foreign markets (Eastern Europe, Middle East, North Africa), processed in refineries located in Southern Italy (Sicily), and then redistributed nationally. The Kuwait depot in Naples handles 60% of the petroleum products in Southern Italy, confirming the

site's strategic role within national energy logistics. See: Kuwait Petroleum Italia, *Bilancio di Sostenibilità* 2021–2022.

5. This dense infrastructure has made the area one of the most environmentally sensitive, with documented risks of spills, leaks, and fire, compounded by its proximity to residential neighbourhoods. See: Prefettura, Ufficio territoriale del Governo di Napoli (2015), *Piano di Emergenza Esterna per le Industrie a Rischio di Incidente Rilevante nella Zona Orientale di Napoli.*

6. The company's ownership - shared between Engie Italia, subsidiary of the French multinational Engie, and Energia Italiana S.p.A. (Sorgenia Group), further situates strategic decision-making beyond the local scale, reinforcing the displacement of responsibility away from affected communities.

7. For documentation and local critic discussion, see: European Commission, CINEA (2024), *Naples LNG Coastal Depot* (2019-IT-TM-0112-S); Morreale (2025, October 11), *San Giovanni a Teduccio: cantieri e nuovo piano portuale minacciano salute, sicurezza e ambiente*, https://enzomorreale.it/2025/10/11/san-giovanni-a-teduccio-cantieri-e-nuovo-piano-portuale-minacciano-salute-sicurezza-e-ambiente/

ABSTRACTS

Across Europe, Environmental Justice (EJ) scholarship has increasingly emphasised the need to analyse the multiple spatialities through which injustice is produced and sustained. Within this debate, EJ in Italy remains understudied, particularly from a spatial perspective. This paper examines EJ in Italy through the lens of contaminated sites, integrating quantitative and qualitative evidence within a complementary analytical framework. A national-scale quantitative analysis shows that socio-demographic disadvantage often coincides with proximity to environmental contamination, in line with broader European patterns, while also exposing the analytical constraints of proximity-based approaches. The case of the Site of National Interest (SNI) "Napoli Orientale" in southern Italy exemplifies how environmental injustice occurs through multiple spatialities of production, responsibility, recognition, and participation, revealing the relational processes that define contaminated sites beyond proximity alone. In doing so, the paper contributes evidence from wider fields of research in Italy to ongoing debates on environmental justice in Europe.

Dans toute l'Europe, les études sur la justice environnementale (JE) soulignent de plus en plus la nécessité d'analyser les multiples spatialités à travers lesquelles l'injustice est produite et maintenue. Dans ce contexte, la justice environnementale en Italie fait l'objet de peu d'études, en particulier d'un point de vue spatial. Cet article examine la justice environnementale en Italie à travers le prisme des sites contaminés, en intégrant des données quantitatives et qualitatives dans un cadre analytique complémentaire. Une analyse quantitative à l'échelle nationale montre que les désavantages sociodémographiques coïncident souvent avec la proximité de la contamination environnementale, conformément aux tendances européennes générales, mais elle met également en lumière les limites des approches basées sur la proximité. Le cas du site d'intérêt national (SNI) « Napoli Orientale », situé dans le sud de l'Italie, illustre la manière dont l'injustice environnementale se manifeste à travers différentes spatialités de production, de responsabilité, de reconnaissance et de participation, mettant en lumière les processus relationnels qui caractérisent les sites contaminés, au-delà de la simple proximité. L'article

apporte ainsi des éléments provenant de domaines de recherche plus larges en Italie aux débats en cours sur la justice environnementale en Europe.

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Mots-clés: justice environnementale, sites contaminés, spatialités multiples, géographie relationnelle, analyse multi-scalaire, Italie, Naples
Keywords: environmental justice, contaminated sites, multiple spatialities, relational geography, multi-scalar analysis, Italy, Naples

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