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EPIDEMIOLOGICAL-ENVIRONMENTAL

GENOCIDE AND NEOLIBERAL URBANIZATION: A CRITIQUE OF THE POLITICAL ECONOMY OF THE
TERRITORIAL PRODUCTION OF DISEASE

**GENOCIDIO EPIDEMIOLÓGICO AMBIENTAL Y URBANIZACIÓN NEOLIBERAL: CRÍTICA A LA ECONOMÍA
POLÍTICA DE LA PRODUCCIÓN TERRITORIAL DE ENFERMEDADES**

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ABSTRACT

This study developed the concept of territorial epidemiological-environmental genocide as a theoretical and political tool to critically examine the health consequences of neoliberal territorial development. From a materialist perspective rooted in the critique of political economy, political ecology, and Latin American critical epidemiology, the research reinterpreted the relationship between urban-industrial restructuring and the structural production of disease in devastated territories. A qualitative, critical, and interdisciplinary methodology was applied, using a theoretical-documentary approach based on indexed academic sources (2020–2025), analyzed through geosocial categories. The results showed that the neoliberal urbanization process functioned as a harmful metabolism of capital, producing zones of socio-environmental sacrifice and exposing communities to chronic contamination. The category of epidemiological-environmental genocide proved useful in explaining the historical and territorial patterns of morbidity and mortality, and in contrasting dominant frameworks such as necropolitics or slow violence. The study also identified emerging collective health practices rooted in territorial resistance and popular knowledge. These practices included grassroots epidemiological surveillance, critical cartographies developed with GIS, and the construction of autonomous health strategies oriented toward environmental justice and the defense of life. In conclusion, the study argued that disease and premature death in specific territories were not isolated or random phenomena, but expressions of structural violence inherent to neoliberal capitalism. By naming this process as genocide, the research sought to decommodify knowledge, politicize public health, and promote the articulation between critical science and social movements committed to building new territorial and epistemic sovereignties in the face of civilizational crisis.

Keywords:

Environmental degradation, environmental health, political economy, public health, social geography, social movements, urban development.

RESUMEN

Este estudio desarrolló el concepto de genocidio epidemiológico-ambiental territorial como una herramienta teórica y política para examinar críticamente las consecuencias sanitarias del desarrollo territorial neoliberal. Desde una perspectiva materialista fundamentada en la crítica de la economía política, la ecología política y la epidemiología crítica latinoamericana, se reinterpretó la relación entre la reestructuración urbano-industrial y la producción estructural de enfermedad en territorios devastados. Se aplicó una metodología cualitativa, crítica e interdisciplinaria mediante un enfoque teórico-documental basado en fuentes académicas indexadas (2020–2025), analizadas con categorías geosociales. Los resultados mostraron que el proceso de urbanización neoliberal funcionó como un metabolismo nocivo del capital, produciendo zonas de sacrificio socioambiental y exponiendo a las comunidades a contaminaciones crónicas. La categoría de genocidio epidemiológico-ambiental resultó útil para explicar los patrones históricos y territoriales de morbilidad y mortalidad, y para contrastar enfoques dominantes como la necropolítica o la violencia lenta. El estudio también identificó prácticas emergentes de salud colectiva ancladas en la resistencia territorial y los saberes populares, tales como la vigilancia epidemiológica comunitaria, las cartografías críticas desarrolladas con SIG y la construcción de estrategias autónomas de salud orientadas a la justicia ambiental y la defensa de la vida. En conclusión, se argumentó que la enfermedad y la muerte prematura en ciertos territorios no constituyen fenómenos aislados ni accidentales, sino expresiones de una violencia estructural inherente al capitalismo neoliberal. Al nombrar este proceso como genocidio, la investigación buscó desmercantilizar el conocimiento, politizar la salud pública y promover la articulación entre ciencia crítica y movimientos sociales comprometidos con la construcción de nuevas soberanías territoriales y epistémicas frente a la crisis civilizatoria.

Palabras clave:

Degradación ambiental, desarrollo urbano, economía política, geografía social, movimientos sociales, salud ambiental, salud pública.

INTRODUCTION

Contemporary cities are the result of the territorialization of the social relations of production and of capitalist-oriented productive forces. Under neoliberalism, the growth and development of urban areas have not only reproduced and deepened the mechanisms of surplus value extraction and the generation of social misery inherent to the general law of capital accumulation (Marx, 1976). As capitalism expanded the global scale of constructed urban space, a series of negative socio-environmental consequences emerged, evidenced in the severe ecological and health crisis that currently characterizes life within the global system of cities (Barreda, 2020).

The neoliberal city, because of the urban reconfiguration of territory driven by capitalism between the end of the twentieth and the beginning of the twenty-first century, expresses the intensification and complication of the real subsumption of territories under specific types of technical and spatial productive forces. These forces strategically articulated the geographic core of the world market (Barreda, 2020). Thus, cities were re-functionalized as spaces that produce ecological devastation of territories and the conditions necessary for the reproduction of population health (Luna-Nemecio, 2024).

From the standpoint of the critique of political economy, this socio-environmental context is understood as the result of the geography of capital itself. This mode of production has reconfigured territories by subsuming them under the logic of global capital accumulation, as well as the correlative valorization of value (Marx, 1976). This historical-epochal process has led to the re-functionalization of the metabolic relationship between human beings and nature, to the extent that it has acquired a specificity wherein the use-value of Nature has been systematically degraded, being formally and really subsumed under the productive (technological) logics driving the development of contemporary capitalism (Veraza, 2023).

Studies carried out by Marxist critical geography address this problem by emphasizing the processes and dynamics evident in the inertia of capital accumulation and the desperate attempts by the bourgeoisie to counteract the tendency of the falling rate of profit. Researchers such as Gouttefanjat (2023) have described the displacement and injustices suffered by rural populations in the face of the development of large-scale and machine-based production processes. Nevertheless, these analytical perspectives remain insufficient, as they fail to establish the direct relationship between the real subsumption of the labor process by capital and the structural and systematic alteration of the natural and social form of social reproduction. Likewise, these reflections do not manage to determine that the development of industrial capital is systematically and persistently responsible for producing various

damages to the physical, psychological, and emotional health of an increasingly proletarianized global population—up to the point of configuring an epidemiological and environmental genocide, affecting both urban and rural communities (Barreda, 2020).

From the critique of political economy, the epidemiological-environmental genocide of the population must be understood as a category that interconnects the ecological devastation of territories with the production of epidemiological curves centered on the massive production of autoimmune and chronic-degenerative diseases (Luna-Nemecio, 2024). In this sense, this massive and intensive production of devastated territories and physiologically and psychologically diseased bodies is understood as the geographic expression of surplus value exploitation mechanisms implemented during neoliberalism. This policy of capital accumulation promoted that the environmental and health costs generated by harmful capitalist technology—which characterized the development of productive forces from the second half of the twentieth century to the present—be directly transferred to communities, transforming the natural and reproductive spaces of their daily lives into pathogenically re-functionalized sites in favor of capitalist reproduction and development.

In this context, the present study assumes that the production of ecological devastation is not the result of an intrinsic characteristic of human beings. Similarly, it is assumed that disease cannot be exclusively explained from a genetic perspective (Guillen-Navarro, 2011). On the contrary, the production of geographies marked by high levels of natural resource extraction and environmental pollution, alongside the multidimensional degradation of human health, is understood as a direct consequence of capitalist development—particularly in its neoliberal specificity.

With this perspective, the study establishes an investigative and reflective bridge with the ontological and epistemological field of political ecology and critical epidemiology (Breilh, 2010). The theoretical fields corresponding to these currents make it possible to understand that the high global rates of diseased populations can be explained if morbidity is related to environmental devastation (Luna-Nemecio, 2024). This framework enables the formulation of the hypothesis that diseases are not only diagnosed but are also geographically located in territories with specific and concrete patterns of urban and industrial development.

This article seeks to address the theoretical and urgent practical need to rationally and thoroughly explain the current health and epidemiological emergency affecting the entire population. This task requires not only the production of critical socio-environmental diagnoses but also the adoption of a political and ethical stance in favor of the

diseased communities. From this political positioning, this study seeks to support the formulation of environmental and health strategies that strengthen national sovereignty and territorial autonomy.

Finally, it is assumed that health and the environment must be studied starting from the recognition that both territories and bodies are spaces where class struggle takes place, as well as spaces subsumed by capitalist technoscience itself (Veraza, 2023). Therefore, the article posits that the category of epidemiological-environmental genocide represents a tool for the deep and radical critique of urban processes promoted during neoliberalism. At the same time, it allows for the critique of how capitalist modernity has historically produced environmental and health emergency scenarios throughout the world market.

The general objective of this research is to theoretically present the category of epidemiological-environmental genocide as a tool to critique the ecological and health effects of neoliberal capitalist development within the urban metabolism of contemporary cities. Based on this objective, the following specific goals are proposed:

1. To understand the specific singularity of the urbanization processes deployed under neoliberalism, which ultimately generate scenarios of ecological devastation of territories whose multiple harmful effects result in the systematic and massive production of zones with high incidence of chronic-degenerative and autoimmune diseases.
2. To establish a theoretical cartography that allows for the understanding of the notion, characterization, and

categorization of the concept of epidemiological-environmental genocide.

3. To describe how the geographical perspective—when instrumentalized through Geographic Information Systems (GIS)—enables the comprehension of the territorialization of the dynamics of devastated territories and diseased bodies through the proposal of critical epidemiological cartographies.
4. To establish the main considerations for building community-centered strategies aimed at creating fronts of struggle, defense, and popular resistance to achieve spaces of epidemiological and environmental justice, as well as to promote an alternative modernity to capitalism—one capable of overcoming the scarcity that capitalism has artificially reinstated within the context of a dazzling development of technical productive forces.

METHODOLOGY

A theoretical investigation was carried out, with a critical, qualitative, and interdisciplinary approach. Based on the critique of political economy (Marx, 1976), political ecology (Solíz-Torres, 2015), and critical epidemiology (Breilh, 2010), the connections between the capitalist reconfiguration of urban territories during neoliberalism and the concomitant production of devastated territories and diseased bodies were reinterpreted.

The research was based on documentary analysis to study the research categories presented in Table 1.

Table 1. Research Categories and Guiding Questions.

Research Category	Characterization	Research Question
Epidemiological-Environmental Genocid	Refers to the geographical dimension of the territorial conditions that enable the systematic and prolonged production of disease and morbidity, directly linked to the implications of capital accumulation—mainly the increasing environmental devastation that characterized urbanization and industrialization processes under neoliberalism.	How can the economic, political, and geographical process that overlaps the neoliberal reconfiguration of urban territories—ultimately transforming them into sources of diseased communities through ecological devastation—be defined and characterized?
Urban Development	Quantitative and qualitative transformation of geographical space based on the needs and interests of capital. A type of city is created whose infrastructure, natural resources, and demographics are produced and reorganized to support the processes of surplus value production and realization.	What are the main characteristics, contradictions, and specificities of urban development processes within the framework of contemporary neoliberal capitalism?
Capitalist City	A city form defined by its design and structure oriented toward generating the conditions necessary for surplus value exploitation and realization. It is characterized by the commodification of life and land rent, as well as the creation of spaces of inequality and territorial injustice based on specifically capitalist social relations of production.	How has the city form been re-functionalized to become a sine qua non condition for capitalist development?

Neoliberal City	A specific historical configuration of the capitalist city form within the context and prevalence of neoliberal accumulation policies. It is characterized by the intensification of dispossession, privatization, overexploitation, and environmental degradation, while also deepening physical and emotional domination mechanisms over the population.	What is the main socio-environmental implications arising from the adaptation of capitalist urbanization processes and mechanisms to the logic of capital accumulation?
Social Production of Disease	The production, reproduction, and development of the conditions that make possible the emergence and complication of complex scenarios of morbidity and mortality within specific communities.	Is there a relationship between the neoliberal configuration of the constructed urban space and the quantitative and qualitative dimensions of population epidemiological curves?

The document search was conducted by exploring databases of indexed articles in Redalyc, Scielo, Web of Science, and Scopus using the search formulas indicated in Table 2.

Table 2. Document Search Formulas.

Data Base	Search Formulas
Scopus	(TITLE-ABS-KEY(("territorial epidemiological genocide" OR "genocidio epidemiológico ambiental" OR "critical political ecology" OR "ecología política crítica" OR "capitalist urbanization" OR "urbanización capitalista" OR "capitalist city" OR "ciudad capitalista" OR "neoliberal city" OR "ciudad neoliberal" OR "territorial health degradation" OR "degradación territorial de la salud" OR "social production of disease" OR "producción social de enfermedades" OR "urban social metabolism" OR "metabolismo social urbano" OR "critical cartography" OR "cartografía crítica" OR "participatory spatial analysis" OR "análisis espacial participativo")) AND (LANGUAGE(english) OR LANGUAGE(spanish)) AND (PUBYEAR > 2019 AND PUBYEAR < 2026)
Web of Science	TS=("territorial epidemiological genocide" OR "genocidio epidemiológico ambiental" OR "critical political ecology" OR "ecología política crítica" OR "capitalist urbanization" OR "urbanización capitalista" OR "capitalist city" OR "ciudad capitalista" OR "neoliberal city" OR "ciudad neoliberal" OR "territorial health degradation" OR "degradación territorial de la salud" OR "social production of disease" OR "producción social de enfermedades" OR "urban social metabolism" OR "metabolismo social urbano" OR "critical cartography" OR "cartografía crítica" OR "participatory spatial analysis" OR "análisis espacial participativo") AND (LANGUAGE: (English OR Spanish)) AND (PY=2020-2025)
RedALyC	Enter individual keywords (e.g., "epidemiological-environmental genocide") in the general search engine. Then manually apply language filters (Spanish/English) and year range (2020-2025).
SciELO	Enter combinations such as: "epidemiological-environmental genocide" OR "critical political ecology" OR "social production of disease" in the search engine. Then manually apply language (es/en) and year range (2020-2025) filters

The following criteria were applied for the initial selection of documents:

1. Publications from peer-reviewed and indexed scientific journals.
2. Year of publication between 2020 and 2025.
3. Must articulate the three core approaches of the research—city, environment, and health—from a critical perspective.
4. Clinical or technocratic studies that lack a social and geographical approach, or that rely on a technocratic analytical framework, were excluded.

The PRISMA protocol was adapted (Page et al., 2021) to carry out the theoretical study. A total of 428 documents were initially identified. These were screened by identifying relevant topics and categories in titles and abstracts, reducing the sample to 150 documents. Subsequently, the introduction section of each document was read to assess relevance, resulting in the selection of 89 documents deemed suitable for answering the research questions.

The selected documents were read and interpreted using the analytical tools of the theoretical frameworks chosen for the study. Themes and concepts were constructed through the systematization of information required to explain the territoriality of disease in the context of hyperurbanization of territory. This analysis enabled:

1. The identification of opportunities regarding the theory of the epidemiological as a geographic category.
2. The establishment of the theoretical and conceptual foundations for what is understood as epidemiological-environmental genocide.
3. The clarification of key elements for the creation of disease cartographies and practices of territorialized collective health.

Given that the study was conceived at a theoretical and conceptual level, no empirical data from fieldwork is presented. However, a methodological outline is proposed for the use of Geographic Information Systems (GIS) as a fundamental analytical tool for conducting territorial diagnoses and developing community-based strategic proposals for addressing the socio-environmental problems identified by local authorities.

DEVELOPMENT

The adoption of neoliberalism as the guiding economic policy of capitalist development led to the urban reconfiguration of territories ceasing to be merely an appendage of the machinic and large-scale industrial complex that sustained global rates of surplus value exploitation. The capitalist construction of cities under neoliberalism became a semi-autonomous process of reorganization of geographical space—most often redefined according to the interests and whims of a privileged sector of the dominant class, predominantly transnational, which, in alliance with commercial and financial capital, created havens for real estate development.

The neoliberal construction of urban space resulted in a deepening and increasing complexity of the real subsumption of the labor process by capital (REF). The ultimate outcome of this process was the configuration of an urban metabolism characterized by environmental destruction and the profound degradation of living conditions for the urban population (Veraza, 2023).

The critique of political economy views the process of neoliberal urbanization as a particular configuration of the territoriality of social relations of production and specifically capitalist productive forces. In this sense, the neoliberal city emerges historically as a territory functional to the self-valorization of value, and as a commodified space whose specificity lies in its conversion into a harmful use-value. Moreover, this type of city aims to create conditions to counteract the tendency of the falling rate of profit of industrial capital and to generate extraordinary profit sources for the financial sector through real estate speculation and mortgage credit (Janoschka, 2011).

Capitalism finds in the neoliberal city a kind of territorial solution to its own developmental contradictions. By commodifying urban land, capital establishes spatial rent and articulates a set of complex mechanisms for the

dispossession of the commons, where the rural areas adjacent to cities end up being formally and really subsumed into the historical conditions of capital valorization.

The neoliberal city constitutes a form of urban development that entails the extraction of high rates of materials, biomass, and water, as well as the consumption of immeasurable amounts of energy; simultaneously, it is the principal producer of colossal volumes of waste and urban residues. Added to this is the fact that its own metabolism is responsible for excreting incalculable quantities of toxic substances into the air, water, and soil, along with other consequences and costs derived from urban expansion (Lara et al., 2017).

The reconfiguration of dynamics, infrastructures, activities, territories, and everyday spaces within the neoliberal city ultimately transforms them into a degraded and degrading urban metabolism. On one hand, urban expansion generates severe environmental externalities; on the other, it produces deep socio-environmental injustices. Altogether, this leads to the precarization of the conditions necessary for the reproduction of life in urban communities, as their populations are forced to live in substandard housing or overcrowded conditions, and to endure daily life without access to potable water, sewage systems, or sanitation. These precarious living conditions are compounded by constant exposure to highly polluting agents that put their health at serious risk (Peña-Zarco et al., 2020).

The environmental devastation and degradation of healthy living conditions for the urban population are regarded—at best—as externalities by the assessments of environmental economics (Giler et al., 2021). However, the critique of political economy understands these territories as expressions of the irrationality inherent to specifically neoliberal capitalism. Within this historical framework—unlike any other period of contemporary capitalism—environment and health have been converted into productive inputs aligned with the reproduction and development of the capitalist mode of production. In this regard, the neoliberal city represents the production of devastated territories and diseased bodies.

The existence of the city entails a whole set of consequences for an increasingly proletarianized humanity. This specific historical form of the urban, affects not only the production of geographical space but also the constitution of a population made sick by the very urban and industrial dynamics that accompany the construction of such cities. This, in turn, can be interpreted and expressed through the logic of the general law of capital accumulation: to the wealth and poverty it produces, one must add the series of ecological and socio-environmental losses that accumulate on the opposite pole of the growing economic

gains amassed by the dominant class sectors favored under neoliberalism (Von Werlhof, 2011).

The neoliberal city has produced a territoriality of disease in which the ecological devastation of territories geographically coincides with the areas where the highest rates of disease—especially chronic-degenerative and autoimmune diseases—are found (Luna-Nemecio, 2024). As a response to this epidemiological-environmental phenomenon, the neoliberal city has constituted itself as a complex network of private hospital services that uphold the schizoid logic of the capitalist medical-pharmaceutical-industrial complex (Lagos, 2021).

In addition, health policy within the neoliberal city has been subsumed under a governance model in which all decision-making revolves around empowering the pharmaceutical industry and private laboratories, while simultaneously undermining, dispossessing, privatizing, and devaluing the community-based knowledge upon which the population relies to confront the severe health crisis in which they have been placed. From this health crisis management policy, the production of disease within the neoliberal city is assumed to be an individual phenomenon whose origin lies in a multiplicity of factors whose complex determination—according to conventional medical science—requires that diseases be understood as genetic-natural problems.

The neoliberal city is a territory diseased in both environmental and social terms. While the expansion of this form of urban development has acquired a global geopolitical dimension, the production of death due to disease—and as a direct or indirect consequence of the ecological devastation of territories—has also reached a global scale. This entails the generation of immeasurable human losses because of this territoriality of disease (Luna-Nemecio, 2024).

Territorial Epidemiological Genocide: A Category of Materialist Critique

The category of epidemiological-environmental genocide is understood as a critical framework to

analyze—through the lenses of the critique of political economy, political ecology, and critical epidemiology—the historical and territorial forms that define the processes of morbidity and mortality production within specifically neoliberal capitalism (Barreda, 2020). The use of the term genocide is not metaphorical nor a categorical overreach; rather, it aims to account for the grave and profound systemic violence that characterizes capitalist development at the turn of the century (Rodriguez, 2024).

Speaking of epidemiological-environmental genocide differs from the concept of pandemics, which refer to pathological processes that acutely reveal the metabolic dysfunction of the global population's immune system (Henao-Kaffure, 2010). It also constitutes a different category from massacres, which have historically marked the trajectory of capitalism, as these are the result of singular events—specific and historically delimited exercises of physical violence that result in the loss of a considerable number of lives (Santalla Vargas, 2014).

In contrast, epidemiological-environmental genocide has a long historical duration, a structural dimension, and intensive systematicity. Its territorial and historical manifestation occurs precisely where it becomes necessary to counteract the falling rate of profit and intensify capital accumulation mechanisms through the extension and deepening of surplus value extraction and valorization, as well as the promotion of dispossession, privatization, and violent enclosure of the commons. This results in the overexploitation of natural resources and the creation of spaces marked by high, chronic, and systematic exposure to chemical substances.

Epidemiological-environmental genocide entails the violent occupation of territories by highly polluting processes, and the creation of inhabited zones characterized by the degradation and precarization of living conditions for the population. The destruction of the environment by capital thus becomes a systematic mechanism that produces entire communities of sickened individuals. This framework allows us to identify four principal constitutive dimensions of epidemiological-environmental genocide (Table 3).

Table 3. Dimensions of Epidemiological-Environmental Genocide.

Dimension	Description
Territoriality	Epidemiological-environmental genocides occur in specific territories—precisely those where urban and industrial processes are implemented whose defining feature is the generation of high levels of environmental pollution. This entails the creation of emergency zones and socio-environmental sacrifice areas.
Environmental and Health Degradation	Refers to the nexus between the destruction of environmental conditions and the production of specific types of diseases. The ecological devastation of urban and rural territories has led to biological and chemical factors directly affecting the immunology of the population, damaging their physical, psychological, emotional, and reproductive constitution.
Political Function	It is a process of political control, insofar as it produces, reproduces, and exacerbates the injustices inherent to the capitalist mode of production. It disproportionately affects the proletarian class in all its diverse and complex forms: industrial, urban, peasant, and Indigenous populations.

Dimension	Description
Economic Function	It is a mechanism aimed at counteracting the falling rate of profit and generating favorable conditions for the exploitation and realization of surplus value. Furthermore, it represents a way of externalizing the economic costs associated with the intensive use of natural resources and the subsequent management of industrial waste.

The category of epidemiological-environmental genocide is distinct from that of necropolitics (García, 2022). While the latter refers to the political management of death processes by the State, it is based on highly questionable positions linked to Foucault's theory of power (Ávila, 2006), which disregards the material dimensions inherent to the processes of reproduction and development of capitalism itself. The category of epidemiological-environmental genocide also diverges from the academic use of the term slow violence (Kramer & Remster, 2022), which seeks to address the cumulative damage produced by prolonged processes. However, this analytical perspective lacks a grounding in the material conditions that enable such accumulation. In contrast, the category of epidemiological-environmental genocide represents a contribution toward understanding the territorial link between the biophysical destruction of territories and the processes of formal and real subsumption of the world by capital.

As an analytical category, epidemiological-environmental genocide not only serves to describe processes of social production of disease linked to the ecological destruction of territories. Above all, it enables an account of the territorial processes involved in the geopolitics of disease (Verzeñassi et al., 2022) and the growing geographical configuration of regions of health and environmental emergencies, resulting from the deployment of various highly polluting urban and industrial processes (Barreda, 2020).

In short, this category not only describes a phenomenon but also organizes an analytical and political strategy. It allows us to recognize that chronic illnesses, premature deaths, mass disabilities, and the ecosystemic collapse of vast regions are not collateral effects of development, but rather planned—though indirect—outcomes of the capitalist mode of production. Naming it genocide is a way to break with the technical consensus that minimizes it as a “public health problem” or “environmental risk.” It denounces it as a systematic crime derived from capitalist logic, not as an exception or externality to be subjected to regulatory mechanisms.

From this perspective, territorial epidemiological genocide is not merely an analytical concept, but a category of political and social intervention in favor of affected communities. It opens the possibility of constructing a radically situated epidemiology, a class-based environmental justice, a critical history of urban and industrial processes, and a cartography of death that serves social movements in their struggle for territory, health, and life.

The empirical validity of this category is confirmed in multiple contexts where the structural logic outlined here is manifested with harshness. Table 4 lists some identified cases of epidemiological-environmental genocide in Mexico and Latin America, where the dynamics of capitalist accumulation have produced systematic patterns of disease and environmental devastation.

Table 4. Cases of Epidemiological-Environmental Genocide in Mexico and Latin America.

Site / Region	Country	Contamination Processes	Identified Epidemiological Effects
Alto Atoyac Basin (Puebla-Tlaxcala)	Mexico	Industrialization corridor since the 1980s; tanneries, textile mills, chemical and food-processing plants discharging directly into the Atoyac and Zahuapan Rivers; chronic absence of functional wastewater treatment	High prevalence of chronic kidney disease, childhood leukemia, breast cancer, hepatic and neurological disorders
El Salto Region (Jalisco)	Mexico	Industrial discharges into the Santiago River from multiple manufacturing sectors; lack of effective regulation or remediation	Increased incidence of respiratory diseases, various cancers, dermatological and gastrointestinal illnesses
Santiago River Basin	Mexico	Persistent discharge of toxic effluents from chemical, pharmaceutical, and agro-industrial facilities; severe river pollution	Chronic renal conditions, immunological disorders, respiratory tract diseases, oncological cases
Industrial Zone of Tula (Hidalgo)	Mexico	Emissions from major petrochemical complexes, including the Miguel Hidalgo refinery and thermoelectric plants; air and water contamination by particulate matter and toxic gases	Pulmonary diseases, neurological impairments, skin and ocular irritations

Apaxco–Atonilco Corridor (State of Mexico–Hidalgo)	Mexico	Cement industries, hazardous waste incineration, and chemical manufacturing; widespread exposure to fine particles and heavy metals	Congenital malformations, chronic respiratory illnesses, elevated cancer rates
Perote Region (Veracruz)	Mexico	Intensive pig farming operations; accumulation of organic waste and manure; contamination of soils and water bodies; proliferation of zoonotic pathogens	Respiratory and gastrointestinal infections, dermal and ocular afflictions, suspected links to H1N1 outbreaks
Fumigated Towns (Santa Fe, Córdoba, Entre Ríos, among others)	Argentina	Expansion of transgenic soybean monocultures and intensive glyphosate spraying; continuous pesticide exposure in rural communities	Congenital anomalies, childhood cancers, spontaneous abortions, chronic respiratory conditions
Mariana and Brumadinho (Minas Gerais)	Brazil	Collapse of tailings dams operated by mining conglomerates (e.g., Vale S.A.); massive release of toxic sludge and heavy metals into the environment, particularly the Doce River	Widespread fatalities, respiratory ailments, cancers, destruction of livelihoods, psychosocial trauma, waterborne poisonings affecting local populations and ecosystems

Source: Prepared by the author for the present research, based on the works of Barreda (2020); and Verzeñassi et al. (2022).

These examples show that epidemiological-environmental genocide is not an exceptional or isolated phenomenon, but rather a structural logic of contemporary capitalism in its neoliberal specificity. It is not a matter of externalities that can be corrected through improved corporate practices or regulatory reforms, but the concrete expression of a productive rationality that treats territory and life as disposable inputs. Naming this process as genocide does not necessarily imply a classical criminal indictment, but rather a theoretical and political assertion: it is essential to understand that illness and death in these territories are not accidents, but the systematic outcome of a development model that sacrifices entire populations in the name of profit.

In this sense, the category of epidemiological-environmental genocide functions as a theoretical-political instrument that enables the denaturalization of the effects of urbanization, industrialization, and extractivism in neoliberal contexts. Its value lies not only in its explanatory power but also in its mobilizing potential: by naming structural violence, it enables the construction of alliances, the generation of resistance, and the demand for environmental and health justice. Furthermore, it opens a field of research that requires transdisciplinary methodologies—where critical epidemiology, social cartography, political geography, and territorial epistemologies can be articulated into radical diagnostics and emancipatory strategies for the defense of life.

3. Cartographies of Epidemiological Critique and Territorialized Collective Health Praxis

The expanded reproduction of capital in its neoliberal phase has involved not only the expansion of dispossession

frontiers but also the increasing sophistication of mechanisms that render harm invisible. In this context, one of the most urgent challenges for a territorial critique of collective health is to dismantle the epistemological apparatus that dissociates disease from its geography, that individualizes what is structural, and that pathologizes bodies without interrogating the territories in which they are inscribed (Martín, 2019). In response, it becomes necessary to develop new tools for analysis, diagnosis, and resistance that reterritorialize health and decommodify knowledge. This is the point of departure for an innovative proposal: the construction of cartographies of epidemiological critique that articulate geospatial analysis, ecosystemic interpretation, and emancipatory territorial praxis.

Cartographies of epidemiological critique must not be understood merely as a technique of representation, but as a strategy of radical interpretation of the socio-environmental metabolism shaped by capitalism and neoliberal specificity. It therefore implies an epistemological rupture with the hegemonic model of public health, which operates under a quantifying, fragmentary, and technocratic logic. In contrast, these cartographies are conceived as tools for the collective production of situated knowledge, embedded within a political practice oriented toward the defense of life.

The methodological innovation lies in integrating Latin American critical epidemiology (Breilh, 2010) with the strategic use of Geographic Information Systems (GIS), not as mere technical platforms but as spaces of political and epistemological struggle (Martín, 2019). From this perspective, GIS ceases to be a neutral monitoring tool and becomes a matrix for visualizing socio-environmental conflict, enabling the mapping of damage geographies, toxicity flows, the differential distribution of disease, and the territorial imprints of capital.

The articulation of these components allows for the construction of cartographies that not only register the presence of disease but explain it in its historicity, its metabolic inscription, and its class dimension. It is about identifying zones of structural sacrifice by overlaying layers of health, ecosystemic, socioeconomic, and social conflict data, thereby revealing the link between specific forms of accumulation (mining, agribusiness, speculative urbanization) and territorial patterns of chronic illness, disability, premature death, and social suffering (Luna-Nemecio, 2024).

Yet the political strength of this proposal lies not only in its diagnostic capacity. Its greatest contribution consists in opening the path for a praxis of territorialized collective health, understood as a process of political reappropriation of the body and territory by communities. This praxis directly opposes conventional public health, which manages bodies without transforming structures, and instead proposes a community, popular, and autonomous ecology of health that links collective care with territorial reconstruction.

Concrete examples of this praxis are already underway and represent genuine forms of insurgent scientific production. Such is the case of the sanitary camps developed by the Instituto de Salud Socioambiental in Rosario, where health data is generated through popular, participatory, and territorialized methodologies (Verzeñassi et al., 2022). These initiatives not only produce data, but also reconstruct the biopolitical memory of territories, inscribe the experience of suffering, and foster community building.

In Mexico, multiple initiatives stemming from the Toxitour and CONAHCYT's PRONACE programs (Barreda, 2020) have implemented similar tools: community-based diagnostics, popular cartographies, local epidemiological monitoring, assessments of polluted water and air sources, and political education in collective health. These initiatives have not simply been reactions to state omission; rather, they are processes of reorganizing knowledge from below. They have broken the epistemic siege imposed by official health and environmental institutions and constructed autonomous agendas for struggle, denunciation, and territorial intervention.

Moreover, these practices are connected to a broader horizon: that of a new popular institutional framework for health. These are processes that, far from depending on a top-down delegation of health responsibilities to the State, build autonomous and community-based forms of collective care. From traditional medicine to agroecology, from self-organized training to local production of pharmaceuticals and herbal remedies, these experiences challenge the biomedical-industrial-pharmaceutical logic and constitute an emerging field of health sovereignty.

In all cases, it becomes evident that collective health cannot be conceived without territory, and that territory cannot be understood without conflict. Therefore, cartographies of epidemiological critique and territorial praxis are not merely technical or sanitary devices—they are constitutive dimensions of a political strategy for the defense and reconstitution of life. This strategy takes place within a frontal confrontation against the pathological metabolism of capital, and articulates cognitive, organizational, and affective dimensions that contribute to restoring the material and symbolic conditions for a dignified life.

The theoretical and methodological findings presented in this study significantly advance our understanding of the health implications of neoliberal capitalist territorial development from a radically critical perspective. The category of epidemiological-environmental genocide, the proposal of cartographies of epidemiological critique, and the identification of a praxis of autonomous, community-based, territorialized collective health represent substantive contributions that broaden, reorient, and challenge the traditional field of public health studies (Granda, 2000), epidemiology (Moreno-Altamirano et al., 2000), urban planning (Tapia, 2018), and political ecology.

A comparative review with previous research reveals important convergences, but also necessary ruptures. Studies in environmental health and ecotoxicology have documented for decades the correlation between industrial pollution, agrochemical use, and non-communicable chronic diseases (Barreda, 2020). Epidemiological research in countries such as Mexico, Argentina, Brazil, and Colombia has demonstrated a high prevalence of illnesses such as kidney failure, childhood cancer, congenital malformations, and respiratory diseases in industrial, agricultural, and mining zones (Verzeñassi et al., 2022). In this regard, the findings of the present study are consistent with the empirical evidence produced by teams such as the Consejo Nacional de Humanidades, Ciencia y Tecnología (Mexico), the Instituto de Salud Socioambiental (Argentina), the Fundação Oswaldo Cruz (Brazil), and other regional centers committed to collective health.

However, this study introduces a conceptual rupture largely absent from those works: a shift in the interpretive framework from a technocratic risk-based analysis to a materialist critique of the production of a territoriality of disease (Luna-Nemecio, 2024). While much of the dominant literature in environmental epidemiology retains a multicausal perspective that tends to dissolve structural determinations into statistical matrices, this article draws on the critique of political economy to show how the production of disease is inherent to the logic of capital valorization and its regime of accumulation and territorial development.

Similarly, although there are valuable studies on necropolitics (García, 2022), slow violence (Kramer & Remster, 2022), and bio/necropower (Ávila, 2006), few offer a theoretical framework capable of situating these forms of violence within the contradictions of capital, its ecological metabolism, and its territorialized mode of domination. The notion of epidemiological-environmental genocide proposed here constitutes a theoretical innovation precisely because it is grounded in a critique of political economy rather than a postmodern ethics of vulnerability. In doing so, it avoids both the aestheticization of suffering and the moralization of disease, recovering instead a structural, materialist, and militant reading of devastation.

The findings of this study may prove significant for researchers across multiple fields. In public health and epidemiology, they problematize dominant theoretical frameworks and contribute to an epistemological reorientation of the field toward critical, territorial, and transdisciplinary paradigms. For critical geography and urban planning, the study offers an alternative reading of urbanization processes—one that does not merely analyze inequalities in infrastructure access but interprets the city and territory as devices of biopolitical exploitation (Ávila, 2006). For environmental studies, it provides a rigorous framework to understand the relationship between social metabolism, political ecology, and collective health.

Moreover, for the public—and especially for communities in resistance—this work offers not only analytical categories but also tools for struggle. Naming genocide, mapping disease, and building territorial health praxis are not neutral academic operations; they are acts of epistemic justice, cultural resistance, and the construction of popular power. In this sense, the article aspires to be read, used, and debated beyond the boundaries of the university.

CONCLUSIONS

The central conclusion of this study is that the concept of epidemiological-environmental genocide constitutes an indispensable theoretical and political tool for understanding and confronting the health consequences of neoliberal capitalist territorial development. This category, constructed from a critical and materialist perspective, reveals how the structural production of disease, suffering, and death is neither accidental nor marginal to the accumulation process; rather, it is functionally integrated into the logic of capital's expanded reproduction. Naming this phenomenon as genocide—with all its ethical, epistemic, and legal implications—constitutes a radical affirmation of life in the face of the system's pathological metabolism.

Secondly, the study concludes that neoliberal urbanization constitutes a specific form of territorial social metabolism that promotes the creation of sanitary and ecological sacrifice zones, in which the most lethal effects of

socio-environmental devastation—driven by hyperurbanization—are concentrated. This pattern is neither homogeneous nor accidental, but is structured by spatial, class-based, and technoscientific hierarchies. In this sense, cities are not merely service centers or spaces of opportunity, but devices for value capture and unequal distribution of harm, whose logic of expansion involves systemic processes of environmental degradation and the destruction of collective health.

The study establishes that the social production of disease must be understood as a territorial manifestation of class conflict. Chronic, metabolic, respiratory, neurological, or renal pathologies, far from being mere biological or individual effects, are collective symptoms of a mode of production and a way of inhabiting cities that is profoundly destructive. In this light, the analysis of health cannot be dissociated from the analysis of the concrete form of capital, its territorial configuration, and its ecological metabolism. Disease, within this framework, is an expression of structural violence, a consequence of the logic of profitability, an externality inscribed in the body.

It is concluded that the territories in which the most evident effects of territorial epidemiological genocide manifest are not merely spaces of victimization but also sites to produce knowledge, community organization, and the construction of alternatives. In these spaces, communities have developed forms of resistance, diagnosis, care, and healing that must be recognized not as empirical complements, but as fundamental nuclei of an emancipatory praxis. These experiences demonstrate that it is possible to build collective health from below, grounded in situated knowledge, mutual care, health sovereignty, and the defense of territory as a condition for life itself.

The research findings support the assertion that the methodological articulation between critical epidemiology and geospatial analysis through Geographic Information Systems (GIS) represents an innovative contribution to the construction of radical diagnoses, tools of struggle, and strategies of intervention. The cartographies of epidemiological critique that emerge from this approach allow for a clear visualization of the unequal distribution of harm, the territorialization of evidence, and the dismantling of the technocratic abstraction that tends to obscure the relationship between capital, health, and space. These cartographies are not neutral representations, but political acts that construct truth from the materiality of bodies and territories.

It is recognized that the concept of territorialized collective health implies a rupture with dominant forms of health intervention, which are centered on the individual, on disease as an isolated event, and on the vertical institutionalization of medical services. Instead, an integral understanding of health is proposed—as a social, ecological, and political

process in which the right to a healthy life depends directly on the economic structure, the relationship with nature, and the way territory is organized. This perspective reorients public policy debates toward environmental justice, social participation, and sovereignty.

The analysis of epidemiological-environmental genocide opens a horizon for reconfiguring research agendas, public interventions, and popular organization. Far from being limited to academic critique or denunciation, this concept can become a central axis for new forms of articulation between university and territory, between critical science and social movements, between rigorous knowledge and direct action. It is a bridge category that enables the formation of political, legal, health, pedagogical, and ecological alliances aimed at systemic transformation.

The study confirms that there is a deep fracture between official discourses of sustainability, public health, and environmental governance, and the daily experiences of thousands of communities living under toxic exposure, structural exclusion, and health abandonment. This fracture is not only discursive but epistemological. While institutional health is based on abstract indicators, standardized protocols, and depoliticized biomedical approaches, communities build their own knowledge, develop comprehensive readings of harm, and elaborate responses tailored to their realities.

It is affirmed that the construction of critical cartographies and the territorialized praxis of health are not merely defensive or reactive practices, but expressions of a politics of life. They are concrete forms of producing a non-capitalist future—one in which health is not dependent on the market, the city is not a device of accumulation, and the body is not a receptacle for externalities. These practices open the horizon of a post-capitalist transition, rooted in solidarity, respect for ecosystemic cycles, and the revaluation of communal knowledge.

The article establishes that the path toward socio-environmental justice cannot proceed without a radical critique of the territorial accumulation regime. It is not enough to denounce visible harms; it is necessary to dismantle the structures that produce them. In this sense, collective health cannot be conceived in isolation or in fragments—it must be integrated into a structural transformation strategy of social metabolism, involving the reorganization of productive systems, the restitution of the commons, and the deep democratization of spatial decision-making.

As with any critical exercise, this study presents limitations that must be acknowledged. First, as a theoretical investigation, it does not present original empirical data collected through fieldwork. While a solid argumentative foundation was built from the analysis of scientific literature, community reports, and existing case studies, no direct empirical systematization was conducted through

surveys, toxicological assessments, or epidemiological testing. This limits the immediate practical applicability of the proposed model, although it lays the groundwork for future empirical research with a critical focus.

Second, by focusing on Latin America—and Mexico in particular—the analysis has a specific geographic and cultural localization. While many of the processes described are extrapolable to other Global South contexts—such as India, South Africa, or Indonesia—their application must be carried out with caution, considering the historical-structural specificities of each social formation. In this regard, there is a recognized need for greater internationalization of the debate and cross-comparative approaches to strengthen the generalization of findings.

A third limitation lies in the level of maturity of the proposed category. Although the concept of territorial epidemiological genocide has been defined, characterized, and exemplified, it still requires contrast, critique, and enrichment by other research teams, popular health networks, and activist training spaces. This work is, therefore, a starting point—not an endpoint—in the construction of a new problematic field.

Despite these limitations, the contributions of this study are significant and offer concrete paths for future lines of research. First, it opens a theoretical-methodological field that could guide empirical studies of a mixed nature, combining qualitative and quantitative techniques, critical mapping and visualization tools, as well as community records of morbidity and lived experience. The model of epidemiological critique cartographies can be replicated at different territorial scales—municipal, regional, national—and across different types of pathologies—metabolic, renal, respiratory, oncological—depending on each area's industrial and environmental pattern.

Second, the results presented here can guide processes of political and technical education in public universities, community collectives, autonomous health networks, and social organizations. Teaching the developed concepts—pathological metabolism of capital, territorial epidemiological genocide, critical cartography, territorialized collective health—can strengthen the training frameworks of new generations of professionals committed to environmental and health justice.

Third, this research may inform processes of strategic litigation, political advocacy, and emancipatory policy formulation. The methodological tools and theoretical foundations could be used in judicial or parliamentary contexts to demonstrate the systematic nature of health damage, to reveal the link between capital accumulation and disease, and to demand structural reparations. Likewise, they could contribute to the design of community monitoring systems, autonomous emergency response

protocols, and normative frameworks for popular territorialized health.

Finally, the development of this research can strengthen alliances between critical academia and social movements—not only as a strategy for legitimacy but as a form of reorganizing the field of knowledge. Breaking the boundaries between scientific and popular knowledge, between structural analysis and lived experience, between university and territory, is one of the most urgent political challenges of our time. The ongoing civilizational crisis, manifested in ecological devastation and the pandemic of chronic diseases, demands new languages, new alliances, and new tools of struggle. This article aspires to contribute to that transformation.

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