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EPISTEME & PRAXIS | Revista Científica Multidisciplinaria | 2960-8341

GREENING

OF CITIES IN THE FACE OF THE EPIDEMIOLOGICAL-ENVIRONMENTAL CRISIS: URBAN AGENDA AND ECOLOGICAL TRANSITION IN METROPOLITAN CONTEXTS

REVERDECIMIENTO DE LAS CIUDADES ANTE LA CRISIS EPIDEMIOLÓGICO-AMBIENTAL: AGENDA URBANA Y TRANSICIÓN ECOLÓGICA EN CONTEXTOS METROPOLITANOS

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Suggested citation (APA, seventh edition)

Luna-Nemecio, J. M. (2025). Greening of cities in the face of the epidemiological-environmental crisis: Urban agenda and ecological transition in Metropolitan contexts. *Revista Episteme & Praxis*, 3(3), 62-72.

Presentación: 13/05/2025

Aceptación: 26/07/2025

Publicación: 01/09/2025



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ABSTRACT

This research focuses on the epidemiological-environmental crisis (EEC) in metropolitan contexts, highlighting how environmental devastation, health deterioration, and social inequality intersect in urban spaces. Urban policies often prioritize speculative real estate ventures, fueling ecological damage and accentuating chronic-degenerative diseases due to water pollution and unsustainable development. This documentary study applied critical urban theory and genetic-structural analysis, selecting peer-reviewed articles from indexed databases; categories included sustainable cities, vulnerability, social inequality, and water resource management. Findings indicate that rapid urbanization, coupled with unregulated wastewater discharge, intensifies contamination and public health threats, especially among marginalized communities. Chronic Kidney Disease (CKD) appears closely linked to exposure to toxic substances. The push for an ecological transition calls for binding land-use policies that transcend speculative models, protecting ecosystems and health. The study underscores the urgency of restructuring urban agendas to foster ecological transitions to mitigate the EEC's impacts. Future research should integrate theoretical and empirical perspectives to generate transformative solutions, prioritizing social justice, environmental sustainability, and inclusive policymaking. Integral collaboration among academics, policymakers, and communities is vital to address vulnerabilities.

Keywords:

Environment, interdisciplinary research, social inequality, sustainable development, urbanization.

RESUMEN

Esta investigación se centra en la crisis epidemiológico-ambiental (CEA) en contextos metropolitanos, destacando cómo la devastación ambiental, el deterioro de la salud y la desigualdad social se entrecruzan en los espacios urbanos. Las políticas urbanas suelen priorizar proyectos inmobiliarios especulativos, lo cual fomenta daños ecológicos y acentúa enfermedades crónico-degenerativas vinculadas a la contaminación del agua y al desarrollo insostenible. Este estudio documental aplicó teoría urbana crítica y análisis genético-estructural, seleccionando artículos dictaminados de bases de datos indexadas; las categorías incluyeron ciudades sostenibles, vulnerabilidad, desigualdad social y gestión del recurso hídrico. Los hallazgos indican que la rápida urbanización, junto con el vertido no regulado de aguas residuales, intensifica la contaminación y las amenazas a la salud pública, especialmente en comunidades marginadas. La Enfermedad Renal Crónica (ERC) aparece estrechamente vinculada a la exposición a sustancias tóxicas. El impulso por una transición ecológica exige políticas de ordenamiento territorial vinculantes que trasciendan los modelos especulativos y protejan los ecosistemas y la salud. El estudio subraya la urgencia de reestructurar las agendas urbanas para fomentar transiciones ecológicas que mitiguen los impactos de la CEA. Las investigaciones futuras deben integrar perspectivas teóricas y empíricas que generen soluciones transformadoras, priorizando la justicia social, la sostenibilidad ambiental y la formulación de políticas inclusivas. La colaboración integral entre academia, tomadores de decisiones y comunidades es vital para enfrentar las vulnerabilidades.

Palabras clave:

Ambiente, investigación interdisciplinaria, desigualdad social, desarrollo sostenible, urbanización.

INTRODUCTION

The historical trajectory of the twenty-first century has been marked by a series of uncertainties and civilizational whims. In this context, the planet's current environmental emergency exerts a direct and immediate impact not only on the biophysical dimension of geographic spaces but also on the social factors that determine the vital reproduction of the populations inhabiting them. Consequently, the deterioration of environmental conditions linked to the production of health has become a decisive factor in the increasing complexity of epidemiological curves. This has given rise to the overlapping of extractive and polluting agents, processes, and dynamics that, taken together, have generated an epidemiological-environmental crisis whose epicenter lies in the production of devastated territories and diseased bodies.

This crisis has exposed economic, political, institutional, legal, technological, and socio-environmental vulnerabilities, none of which spare metropolitan areas. The contradictions and conflicts characterizing social reproduction within cities have intensified with the development of the epidemiological-environmental crisis. These challenges have worsened as metropolitan zones expand beyond their borders, altering their relationship with adjacent rural areas.

Against this backdrop, the transformation of the urban agenda toward ecological transition in metropolitan contexts appears curtailed or, at best, suspended. This is due to an articulation of various logics of urban space production—driven by capital accumulation and the circulation of commodities—combined with a questionable governmental response to the health crisis on a global scale. Public policies designed to manage both the ecological and the health crisis have demonstrated a concerning lack of sensitivity, financial capacity, and political will. As a result, they have neither effectively responded to the emergency nor prevented the territorial configuration of vulnerabilities within urbanized spaces (Ponce de León, 2020).

The epidemiological-environmental crisis (EEC) has been accompanied by governmental discourses that place the onus for environmental degradation on the final consumer in urban areas. Simultaneously, naturalistic explanations have been promoted, reducing the complexity of health production processes to genetic factors and obscuring the structural determinants of the crisis. These reductionist interpretations have engendered: (a) an increase in social inequality and exclusion, leading to higher unemployment rates and an expansion of the population living in extreme poverty; (b) a surge in domestic violence and gender inequality; (c) a heightened visibility of the urban food crisis, where millions of people depend on highly chemicalized industrialized foods (Nicola et al., 2020); and (d) a substantial transformation in urban life dynamics

and the use of public space. In this sense, the crisis has cast doubt on the feasibility of advancing toward sustainable and resilient cities.

The strategies and public policies adopted by various governments in Latin America and other regions to address the EEC have revealed not only the loss of relevance of urban agendas but also structural biases and limitations in their design. Many of these policies have been formulated uncritically under hegemonic imaginaries of sustainability. An additional problem concerns the notion of governance as a supposedly horizontal and plural decision-making mechanism, even though many of these initiatives perpetuate unequal power relations and favor specific sectors. These constraints hinder the achievement of an effective transformation of the urban agenda oriented toward ecological transition (Zabaniotou, 2020).

Considering this scenario, it is increasingly urgent to reflect on new horizons for conceptualizing the city in times of environmental devastation and health crises (Iracheta, 2020). It is necessary to propose urban research strategies and public policy designs that effectively address socio-environmental issues generated by the EEC in urbanized spaces.

Urban problems associated with environmental overexploitation and pollution have been exacerbated by methodological, operational, and financial shortcomings that hamper assistance to at-risk populations. The difficulty in identifying and reaching these groups is intensified in areas of environmental and health emergencies, where urban development has been influenced by the overlapping of toxic agents and polluting processes (Baldwin & Mauro, 2020).

Old urban problems have resurfaced under the EEC. Not only is it necessary to deepen the study of these challenges, but there is also a historical opportunity to formulate new lines of inquiry into urban policy, social inequality, environmental vulnerability, water resource management, and access to healthcare. These studies must be conducted at different geographical scales to fully grasp the global, national, regional, and local manifestations of these phenomena (Robles & Rivera, 2020).

Faced with the urgency to transition toward a sustainable and resilient urbanization model, it is essential to reconfigure metropolitan areas from a perspective that integrates economic, productive, technological, pedagogical, and socio-environmental justice issues in relation to the EEC. The immediacy of the pandemic has underscored the need for geospatial analyses that critically address the relationship between urbanization and disease territoriality. Incorporating the production of diseases into the epistemological and methodological frameworks of urban-territorial research would enrich diagnoses and

enable researchers to surpass the constraints imposed by conventional approaches.

This study proposes a series of arguments that, in the form of general hypotheses, could be reworked in future applied research on specific cases. The aim is to contribute to the analysis of the EEC and its relation to the greening of cities in the face of the epidemiological-environmental crisis.

The research objectives were to: (1) describe the array of challenges the EEC poses to achieving sustainable and resilient urban transitions; (2) address the importance of conducting research on urban policy and spatial planning to help build urban territories that are sustainable and resilient to extreme and atypical events like the current EEC; (3) demonstrate how the EEC has intensified the need to examine conditions of vulnerability and social inequality, given that the spatial manifestation of disease is not homogeneous and its effects are more acutely felt by marginalized and impoverished populations; and (4) outline emerging research needs arising from the growing demand for potable water services in relation to spatial patterns of water pollution in cities under the emergency conditions posed by the EEC.

METHODOLOGY

This study relies on documentary analysis and the theoretical perspective of genetic-structural approaches for investigating socio-ecological systems in conflict. Drawing on critical urban space theory (Paez, 2020), the present work proposes new lines of urban research that emerge or develop from considering the array of transformations, challenges, and uncertainties that the epidemiological-environmental crisis (EEC) has engendered regarding the dynamics of space production and everyday life within cities, underscoring the imperative need to transition toward sustainable and resilient urban environments.

A qualitative documentary study was conducted following the methodology proposed by Vázquez-Ayala (2020). Documentary analysis here is understood as the selection, search, and review of scholarly literature based on pre-established research categories. Utilizing the gathered information and applying grounded theory, the research findings were presented through a critical analysis of documents, aimed at addressing each of the study's objectives.

The determination of analytical categories was key to conducting the documentary analysis. Each category is linked to the central objective of the study: proposing new lines of urban research in response to the EEC. For each analytical category, a set of research questions was established to guide the search and selection of the required information as well as the subsequent critical analysis that addressed the specific topic under discussion (Table 1).

Table 1. Research categories and questions for envisioning new lines of urban research in the face of the EEC. Source: Prepared by the authors for this study.

Research Category	Research Questions
Sustainable Cities	How can we define and characterize a sustainable city? What challenges does the current pandemic pose for achieving the transition toward sustainable cities?
Urban Policy and Land-Use Planning	Which dimensions of land-use planning should be part of an in-depth academic reflection for rethinking the post-pandemic urban reconfiguration of territory? What issues in urban policy have been highlighted by the EEC?
Vulnerability and Social Inequality	In what ways has the EEC complicated scenarios of vulnerability and social inequality within cities? What research elements should be developed to respond effectively to the spatial needs of populations impacted by the effects, problems, and conflicts linked to ecological devastation and the deterioration of environmental conditions that shape urban health?
Urban Water Demand and Consumption	What needs in the management, administration, and handling of urban public water resources have emerged considering increasing contamination of surface and groundwater sources? Which elements of urban planning for water supply and wastewater treatment should be further developed?

The search and selection of the documents analyzed in this study were based on the following criteria:

1. Only scientific articles published in indexed journals listed in Scopus, Web of Science, Redalyc, Scielo, and Latindex were considered.
2. The keywords used to guide the document search included: *contamination, social inequality, pandemic, vulnerability, water resources, urban transformation, urban sustainability*. Additional keywords used to complement the search included: *water pollution, socio-environmental problems, urbanization, disease, urban planning, land-use planning*.
3. Although the core focus was on scientific articles published in indexed journals, some academic book chapters were also used to contextualize the study and support the argumentation around the EEC, provided they had undergone a rigorous peer-review process.
4. The selected documents were published between 2020 and 2024. Older articles were occasionally included if there was a lack of updated research on any of the categories.
5. The articles had to explicitly refer to at least one of the research categories; priority was given to works

addressing environmental devastation and the deterioration of health conditions in urbanized spaces.

RESULTS AND DISCUSSION

The effects of the epidemiological-environmental crisis (EEC) are not confined solely to health or environmental dimensions. The very epidemiological dynamics of the disease have intensified, exacerbating and complicating economic, social, and environmental risk and vulnerability scenarios for humankind, particularly within globalized urban spaces. This is due to cities constituting the territorial expression of specific economic dynamics and productive forces, marked by high consumption of biomass, materials, energy, and water resources, as well as the excessive generation of solid, chemical, and greenhouse gas emissions.

In this context, metropolitan areas become strategic territories for understanding the epidemiological development of various types of illnesses, including both infectious-contagious diseases and, especially, chronic-degenerative ones. As a result, it is possible to draw a correlation between the social production of diseased bodies and urban territories whose underlying logic of construction necessarily entails systematic processes of environmental devastation and the sustained deterioration of general living conditions.

Contemporary urban form, given its high social and environmental costs, is crucial for understanding the specific ways in which diseases are produced. Nevertheless, the city is not only a site for critical diagnosis but also a privileged setting for articulating, designing, and implementing alternatives, strategies, and solutions that can mitigate the consequences derived from the EEC. In this sense, metropolitan areas have emerged as locations where the economic and socio-territorial effects of the disease are manifested with intensity, making them foundational spaces for radically transforming the urban agenda toward an ecological transition, especially in light of the current health emergency.

From this perspective, it is necessary to consider how a sustainable city might be defined and characterized, such that greening serves as a strategic response to the proliferation of chronic-degenerative diseases linked to systematic processes of environmental overexploitation and pollution. While sustainability has not historically been the central feature of contemporary urbanization processes, it is worth noting that since 2015, the construction of sustainable cities and communities (Sustainable Development Goal 11) has been formally integrated into the Sustainable Development Goals (Ezquiaga-Domínguez, 2019). Nevertheless, little progress has been made in the concrete spatial realization of agendas aligned with this goal,

particularly since the health emergency triggered by COVID-19.

Sustainable cities should be defined not only by promoting conditions that avoid negating the historical possibilities for future generations to meet their needs, given the current overshooting of planetary biophysical boundaries (Lade et al., 2020). Beyond this, the redefinition of urban processes in terms of life care and reproduction becomes essential both for environmental conservation and for the effective promotion of equitable and inclusive scenarios that guarantee adequate nutrition, quality education, and universal access to healthcare services. Such an approach can foster comprehensive human development grounded in local adaptations of social and environmental justice.

Likewise, transforming the urban agenda toward ecological transition in metropolitan contexts considering the current effects of the EEC should be understood as a logical outgrowth of urban sustainability. Seeking to green urban spaces in response to the emergence of chronic-degenerative diseases tied to environmental devastation calls for strengthening capabilities and skills to reclaim the historically embedded productive, circulatory, distributive, and consumption dynamics within cities. This underscores the urgency of reestablishing and consolidating governmental and societal strategies aimed at overcoming the socio-environmental impacts generated by the EEC.

Finally, in presenting several challenges that the current pandemic brings to the fore for advancing the transformation of the urban agenda toward ecological transition in metropolitan contexts, it is crucial to note that although such a transition necessarily involves the construction of sustainable cities, the two concepts should not be uncritically conflated. It is recognized that there are cities in which urban transformations aimed at ecological objectives do not necessarily lead to a genuinely comprehensive horizon of sustainability.

Urban Policy and Land-Use Planning for Building Sustainable Cities Toward Ecological Transition in Metropolitan Contexts

Urban policy in Latin American cities and other regions is characterized by the promotion of real estate ventures driven by speculation (Steel et al., 2017; Su & Qian, 2020). This dynamic has given rise to an urban model defined by irregular human settlements, overcrowding, the privatization of space, and the gentrification of everyday life (Blanco & Apaolaza, 2018). Consequently, a fundamental dimension of land-use planning—one that demands in-depth scholarly reflection when rethinking sustainable urban reconfiguration—consists in establishing it as a unique, binding, and mandatory legal instrument that transcends a developmentalist approach focused solely on human settlements and real estate projects.

In the face of the environmental and health emergency of the 21st century, it is imperative to transform current Land-Use and Ecological Planning so that it moves beyond its current role as a mere facilitator of real estate ventures. A comprehensive reform of land-use and sustainable development laws in cities is urgently needed, one that prioritizes ecological conservation and social needs over the economic interests of powerful groups dedicated to privatizing the social means of producing urban space.

Regarding the transformation of the urban agenda toward ecological transition in metropolitan contexts in the wake of the EEC, it is crucial to promote research that updates socio-territorial statistics and cartography on natural resources, urbanization, and industrialization in cities. In addition, territorial planning should be centralized under a single institution to avoid overlap among various governmental agencies; the duplication or triplication of efforts leads to imprecise, contradictory, and costly diagnoses, thereby complicating the development of a clear and coherent urban agenda aligned with socio-territorial priorities.

The emergence and territorial spread of both infectious-contagious and, more significantly, chronic-degenerative diseases have shed light on numerous issues inherent in current urban land-use and ecological policies, creating new avenues for academic inquiry. In response, urban policy must cease to function as a merely indicative or diagnostic tool. It is therefore vital for Land-Use Planning and Ecological Territorial Planning to carry mandatory and binding force, including fines or even criminal penalties for noncompliance. Such measures will enable the development of effective environmental and territorial policy instruments that ensure urban development respects natural metabolic cycles, while simultaneously promoting equity, inclusion, and social and environmental justice.

Although urban policy derived from sustainable Land-Use and Ecological Planning—aimed at restructuring urban dynamics to confront emergencies such as the current health crisis—would likely have positive effects in reducing socio-environmental risks and vulnerabilities generated by the social production of globalized urban space, a more thorough and effective implementation is required.

To advance the transformation of the urban agenda toward an ecological transition in metropolitan contexts, it is imperative to develop lines of research that inform decision-making. Such studies should ensure that land-use and ecological territorial plans, as instruments of spatial production, do not devolve into flexible policies designed primarily to facilitate private real estate investments under the pretext of promoting social development.

Vulnerability, Social Inequality, and the Rise of Poverty due to the Differentiated Spatial Distribution of Disease Production

The territorial distribution of confirmed cases of illness and death associated with pathologies linked to contaminating factors and processes has manifested in a differentiated manner (Ramírez, 2020). The same is true of the economic, social, and environmental impacts resulting from government policies implemented to confront the current epidemiological transition. Recent studies, such as that by Gracia Ortiz et al. (2020), show that the population most vulnerable to the EEC is precisely that living in poverty and extreme poverty, in urban contexts characterized by high levels of socio-environmental inequality.

To understand how the EEC itself is both a condition and a product of the increasingly complex scenarios of vulnerability and social inequality in cities, it is crucial to focus on those territories classified as areas of socio-environmental risk and vulnerability arising from urban reconfiguration processes. The productive and consumptive dynamics of urban space have led to an intensification in the production of comorbidities. Therefore, it is vital to emphasize the need for urban research that examines in depth the degree of correlation between environmental crisis, the prevalence of diseased bodies, and the number of deaths linked to diseases generated by contaminating processes and agents in cities with high levels of urban density and demographic concentration.

In the same vein, territorial and urban research must address social inequality as a determining factor in urban epidemiological trends. For example, studies by Van Dorn et al. (2020), highlight particularities in epidemiological profiles under critical public health circumstances—such as those posed by the recent COVID-19 quarantine—revealing that the neighborhoods most severely impacted by this disease in the United States were those marked by social inequality, especially areas with large migrant populations or racially marginalized communities. These groups are frequently excluded from effective public health policies or poverty-reduction programs.

Urban spaces characterized by elevated levels of vulnerability and social inequality also demonstrate the challenges their inhabitants face in securing proper access to essential services like potable water. These vulnerable areas typically exhibit high rates of chronic-degenerative diseases, which exacerbate the clinical picture of contemporary urban dynamics.

Finally, an additional aspect that urban research must consider, to respond effectively to the needs of populations affected by the EEC, is establishing robust links between academia and policymakers. Such policies must

move beyond purely substantialist frameworks, aiming instead to preempt further increases in vulnerability and social inequality within urban spaces.

Spatial Dynamics and Patterns of Water Pollution and Their Relationship to Chronic-Degenerative Diseases (Chronic Kidney Failure)

Mexico's water crisis is shaped by a range of challenges. First, it is defined by the overexploitation of water resources, especially underground aquifers. Second, it involves pollution stemming from unregulated wastewater discharges from industry, agribusiness, and various extractive activities (primarily open-pit mining). As a result, more than 70% of rivers in Mexico exhibit some degree of contamination owing to the illegal discharge of chemical substances by thousands of industrial facilities.

Wastewater discharged irregularly into water bodies and ravines contains a wide array of contaminants, including bacteria, viruses, parasites, fertilizers, pesticides, pharmaceuticals, nitrates, phosphates, plastics, fecal waste, heavy metals, endocrine and hormonal disruptors, and radioactive substances.

While official statistics regarding wastewater accounting may be questionable in terms of methodology and reliability, examining the spatial distribution of unregulated industrial and urban wastewater discharges can be illustrative (Figure 1).

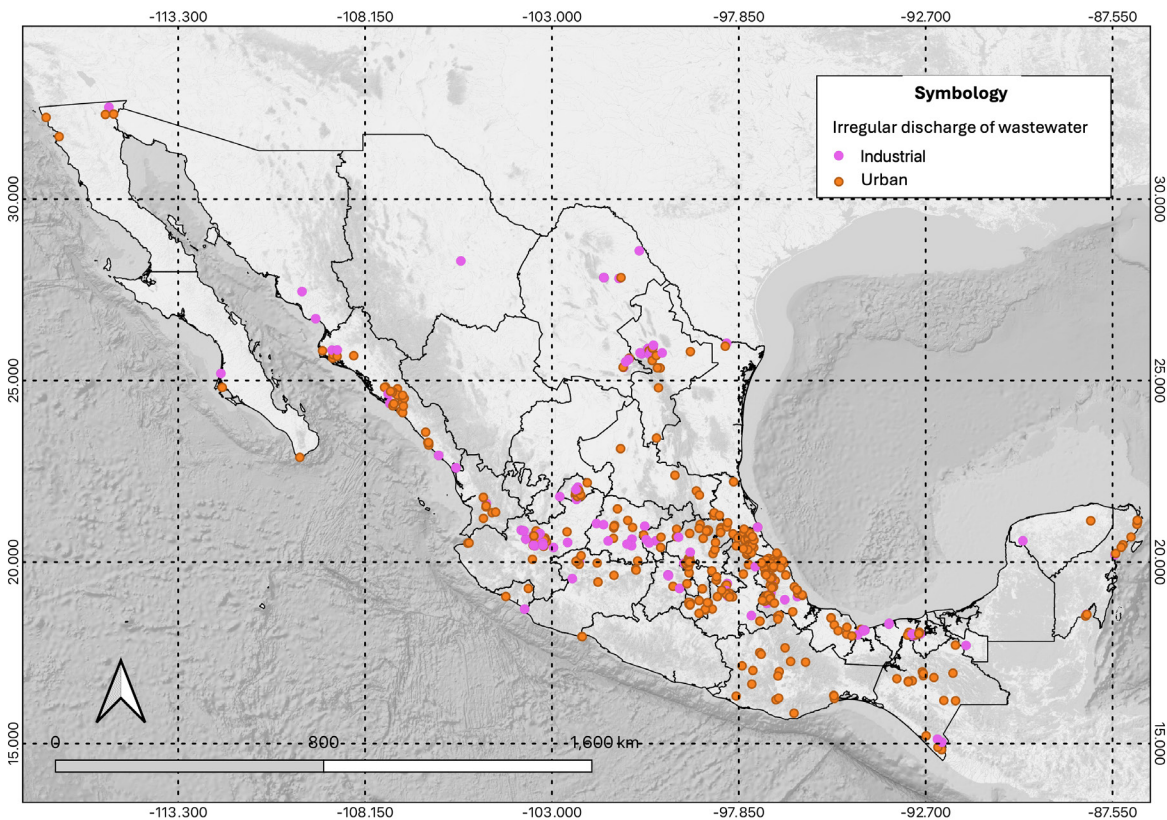


Figure 1. Irregular discharge of wastewater from industrial and urban sources.

A geospatial analysis reveals that clusters of industrial and urban wastewater discharges are primarily located in central Mexico. Beyond that region, the case of Nuevo León stands out, where there is also a high concentration of industrial discharges containing various toxic substances, allowing for an established link between water pollution and the rise in chronic-degenerative diseases (Table 2).

Table 2. Territories Devastated by Chemical Substances and the Production of Chronic-Degenerative Diseases.

Cities with Higher Levels of Wastewater Pollution	Contaminating Substances Discharged into Wastewater	Chronic-Degenerative Pathologies Linked to the Presence of Chemical Substances and Contaminating Processes
Aguascalientes Aguascalientes, Jesús María, San Francisco de los Romo	Aldrin Analgesics Anesthetics Antibacterials Antidepressants Antihypertensives Anti-inflammatories Arsenic Cadmium Cypermethrin Cyanide DDT Endosulfan Fluorides Glyphosate Synthetic hormones Malathion Mercury Nitrates and nitrites Paraquat Lead Selenium Sulfates and sulfur compounds Thallium	- Spontaneous abortions
Mexico City Xochimilco, Iztapalapa, Gustavo A. Madero		- Allergies
State of Mexico Ecatepec de Morelos, Toluca, Naucalpan, Tlalnepantla, Chimalhuacán		- Anemia
Guanajuato León, Salamanca, Celaya, Irapuato, Silao		- Asthma
Hidalgo Atitalaquia, Pachuca, Tula de Allende, Tepeji del Río, Mixquiahuala		- Colon cancer
Morelos Cuernavaca, Jiutepec, Temixco, Emiliano Zapata, Cuautla		- Liver cancer
Puebla Puebla, San Martín Texmelucan, Atlixco, Tehuacán, Amozoc		- Skin cancer
Querétaro Santiago de Querétaro, San Juan del Río, El Marqués, Corregidora		- Lung cancer
Tlaxcala Tlaxcala, Apizaco, Huamantla, Chiautempan, Santa Ana, Chiautempan		- Thyroid cancer
Veracruz Coatzacoalcos, Minatitlán, Poza Rica, Veracruz, Córdoba	- Headaches	
		- Conjunctivitis
		- Genetic damage and hormonal disruption
		- Neurological damage
		- Dermatitis
		- Cardiac failure
		- Liver failure
		Respiratory failure
		Typhoid fever
		Dental fluorosis
		Skeletal fluorosis in children
		Gastroenteritis
		Infertility
		Skin infections
		Respiratory tract infections
		Chronic kidney failure
		Leukemia
		Congenital malformations
		Osteoporosis
		Gastrointestinal conditions
		Malaria
		Learning disabilities
		Endocrine disorders
		Premature thelarche in children

Although CKD does not appear among the principal causes of morbidity and mortality in official statistics, its prevalence is on the rise. This situation can be partly attributed to challenges in diagnosing the disease, as well as to a lack of clarity in the classification and nomenclature used by healthcare institutions.

Moreover, agencies such as the Ministry of Health and the National Institute of Public Health emphasize the multifactorial nature of CKD, thereby downplaying its possible connections to environmental pollution. Nonetheless, a correlation exists between exposure to toxic substances (lithium, cadmium, mercury, lead, arsenic, paraquat, glyphosate) and the increase in CKD cases in specific regions.

A spatial analysis of municipalities with high death rates from CKD and those featuring both industrial and urban wastewater discharges makes it possible to classify affected individuals as “environmental patients” (Figure 2). This finding indicates that these territories can be considered “sacrifice zones,” where ecological and health injustices are tangibly evident.

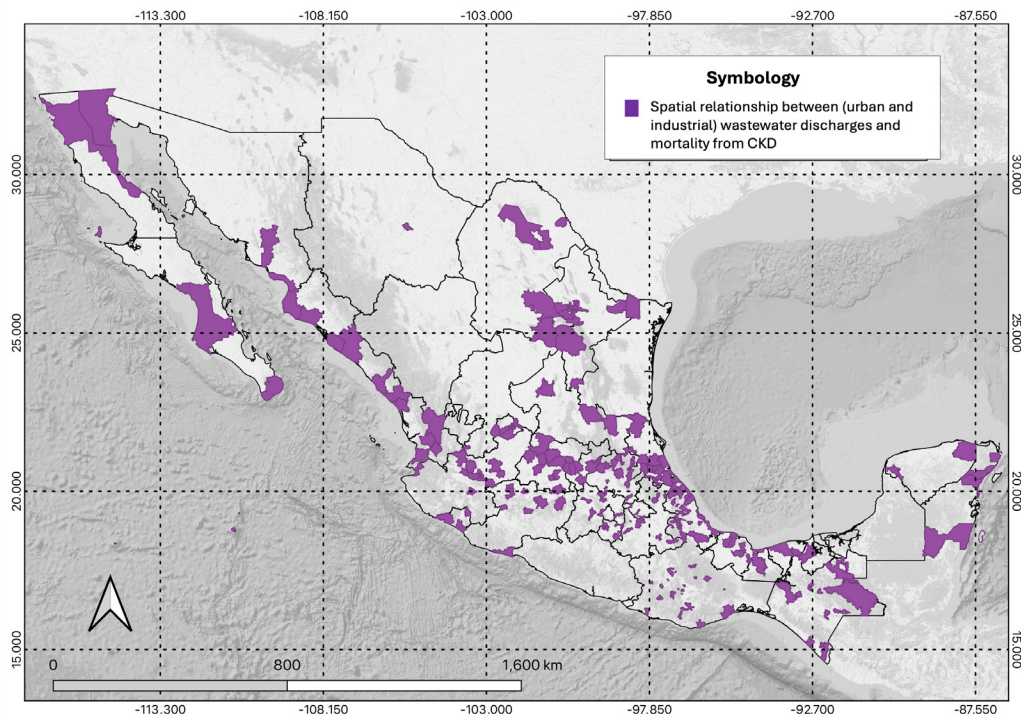


Figure 2. Spatial relationship between (urban and industrial) wastewater discharges and cases of deaths from chronic kidney disease (CKD). The documentary study presented here acknowledges that the transformation of the urban agenda toward an ecological transition in metropolitan contexts, considering the epidemiological-environmental crisis (EEC), has significantly influenced scientific discussions and political discourse. A recurrent pattern is observed: tendencies toward conceptual gaps and vague or non-specific proposals regarding concrete strategies for truly implementing an urban transition. Contrary to Delgado’s approach, this study underscores the need to tackle such a transition from structural, functional, and relational perspectives that enable the development of solutions and the identification of concrete capabilities for devising public strategies and policies to mitigate the EEC’s impacts.

Cities are strategic territories for halting and even reversing the progression and intensification of the EEC, as they currently exhibit the highest number of infections and deaths associated with chronic-degenerative illnesses. As such, these spaces are characterized by multiple comorbidities that intensify the urban epidemiological profile, a phenomenon validated by studies such as that of Treviño (2020).

Urban space, understood as both a material and social construct, offers a host of scenarios in which the greatest proportion of natural resources, materials, and energy is consumed. Likewise, it is within cities that the largest volume of solid and chemical waste is generated, significantly affecting the global biophysical-chemical balance, including the emission of over 75% of greenhouse gases (GHGs). Consequently, examining cities from the perspective of the EEC is of strategic importance not only for proposing novel lines of research and public policies aimed at resolving this problem in the medium and long term, but also for designing immediate interventions for

populations living in conditions of heightened vulnerability and social inequality.

The nexus between environmental devastation, the deterioration of health, and social vulnerability has been rigorously examined by Barreda and García-Barrios (2020). Building upon and drawing support from that analysis, the present study expands the discussion to encompass investigations that focus exclusively on social vulnerability among children, demonstrating that the EEC exerts a transgenerational impact beyond any confined or narrow analytical lens.

The proposal for producing sustainable urban spaces and transforming the urban agenda toward an ecological transition in metropolitan contexts—responding to the EEC’s impacts—as well as the lines of investigation suggested in this study, must be clearly distinguished from the so-called “smart city” urbanization approaches (Kunzmann, 2020). Equally crucial is avoiding the epistemological boundaries presented by “ecological urbanism (Cooke, 2020), which, despite professing to prioritize environmental

conservation, frequently overlooks key aspects of economic growth and holistic human development. In practice, these approaches often yield urban areas dominated by increasing surveillance and social control. The EEC highlights the need to explore urban research from fresh epistemological perspectives, including those advanced by critiques of political economy and the territoriality of disease.

Although transforming the urban agenda toward an ecological transition in metropolitan contexts has gained substantial visibility in the academic literature on cities, a significant lack of consensus persists regarding the conceptual specificity of both terms. It is therefore imperative to encourage research that critically addresses the definition, characterization, categorization, interrelation, differentiation, and exemplification of these concepts, as well as the methodological design that translates theoretical urban reflections into practice in response to the EEC and the broad spectrum of issues opened by this contemporary juncture.

Finally, the environmental and epidemiological emergency characterizing the development of the twenty-first century underscores the importance and urgency of conducting rigorous scientific research into the socio-territorial capacities required for effectively transforming the urban agenda toward an ecological transition in metropolitan contexts, especially given the economic and social effects stemming from the EEC.

CONCLUSIONS

This study has highlighted the urgent need to cultivate new imaginaries that orient possible ways to overcome the effects of the current EEC. Specifically, it is indispensable to critically question paradigms that expose the power struggles arising from interactions among governmental and non-governmental actors when shaping both the direction and the ultimate purpose of the urban agenda. These conflicts often favor market-driven processes tied to specific territorial urbanization projects, subordinating socio-environmental needs to narrow economic interests.

Through its documentary analysis, this research has underscored the need to fundamentally overhaul the epistemological, theoretical, and methodological frameworks that guide urban investigations. This overhaul is crucial for spurring the effective transformation of the urban agenda toward an ecological transition in metropolitan contexts, thus supporting urban sustainability. The study delved into the existing link between the EEC and the predominant definition of an urban agenda that amplifies the negative consequences of environmental devastation and the resulting deterioration of public health in metropolitan areas. In this regard, it became evident that the contemporary urban form—particularly shaped by the neoliberal model—acts as a catalyst for socioecological sacrifice

zones, leading inexorably to a marked increase in chronic-degenerative diseases, especially in communities exposed to extractive and agro-industrial activities, as well as accelerated urban expansion.

Furthermore, this study proposes several avenues for future research: (1) urban policies and land-use planning oriented toward greening cities through ecological transformation of the urban agenda in metropolitan contexts; (2) identification and analysis of urban scenarios characterized by vulnerability, social inequality, and escalating poverty stemming from the uneven spatial distribution of the EEC; and (3) investigation into the spatial dynamics and patterns of water pollution in cities within a context of health and environmental emergencies. These suggested lines of inquiry must first be addressed at a theoretical level, followed by empirical research in diverse urban settings. Collaboration among various stakeholders, researchers, and interdisciplinary teams will be essential for developing comprehensive territorial analyses in response to socio-environmental and health emergencies in urban areas.

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