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Why Environmental Pollution Is Disproportionately High in Low-Socioeconomic Communities in California

Environmental pollution in California is not evenly distributed. Wealthier neighborhoods often benefit from cleaner air and stronger environmental protections, while low-income and historically marginalized communities experience disproportionately high exposure to environmental hazards. These disparities arise from intertwined social, economic, and political forces shaped by poverty, segregation, and long-standing inequities in land-use planning. Understanding why pollution accumulates in certain areas requires examining both global patterns of environmental inequality and state-specific systems that determine where risk is placed.

At a global scale, economic vulnerability is strongly associated with harmful air pollution exposure. In *"Global Air Pollution Exposure and Poverty,"* Jun Rentschler and Nadezda Leonova use the 2021 World Health Organization $PM_{2.5}$ thresholds to analyze long-term particulate matter exposure across more than two hundred countries. Their findings reveal that "...around 7.3 billion people are directly exposed to unsafe average annual $PM_{2.5}$ concentrations, 80 percent of whom live in low- and middle-income countries" (Rentschler and Leonova). This

staggering statistic highlights how deeply poverty shapes environmental risk. Limited economic power, inadequate housing, and poor infrastructure frequently force marginalized groups to live near industrial zones, busy highways, and dense urban areas where air quality is compromised.

Rentschler and Leonova also emphasize how pollution reinforces poverty because pollution increases poor health in the communities making it harder for those to afford a means to rehabilitate themselves on top of the expenses they have. According to their analysis, environmental exposure "traps vulnerable communities in cycles of environmental and economic risk," reducing productivity, damaging long-term health, and increasing medical burdens (Rentschler and Leonova). Their conclusions provide a foundation for understanding why disadvantaged communities across the world, especially those in California, face compounding challenges when confronting pollution. These global trends take on a distinct form in California, where low-income neighborhoods are often located near freeways, refineries, ports, agricultural burning sites, and major industrial corridors. For example, many communities in the Central Valley consistently receive failing air-quality grades, partly because homes built in low-income areas are positioned close to agricultural emissions and transportation routes. These neighborhoods often lack the political leverage or financial resources necessary to oppose polluting developments or demand stronger enforcement. As a result, geographic patterns of inequality mirror the economic patterns identified by Rentschler and Leonova.

Economic vulnerability, however, is only one part of the picture. Structural racism further intensifies exposure disparities in California. In *"Structural Racism as an Environmental Justice Issue,"* Camila H. Alvarez analyzes environmental health data from more than sixty thousand census tracts and compares it to a state-level index that measures inequalities in education, housing, incarceration, and employment. Alvarez found that "tracts in states with a higher state-

level Black–white gap report greater environmental health risk exposure to outdoor air pollution," indicating that institutional racial inequality is directly linked to pollution patterns (Alvarez). The article explains that discriminatory housing policies, such as redlining and exclusionary zoning, pushed communities of color into areas considered less valuable, areas that later became the preferred locations for highways, refineries, landfills, and other high-pollution facilities. Alvarez challenges the reader to view, "structural racism [as] an environmental justice issue" because these historical decisions continue to shape modern landscapes. Neighborhoods that were once denied investment now face higher rates of asthma, cancer risk, and exposure to toxic emissions.

California provides clear examples of environmental injustice towards communities facing poverty. Many of the state's major freeways are commonly constructed through Black and Latino communities. Industrial zones grew around neighborhoods with the least political influence. Even now, zoning laws often permit polluting industries to operate in or adjacent to low-income residential areas but prohibit them in wealthier districts. Environmental regulations may exist, but enforcement is inconsistent, and communities with less political or economic capital often do not receive the same level of protection. By combining poverty and structural racism, the environmental burden placed on low-socioeconomic communities becomes a product of power, history, and policy rather than chance. Pollution follows patterns of disenfranchisement. It flows toward neighborhoods where resistance is most difficult and settles in areas that have long been deprived of resources.

The unequal distribution of pollution has continued to cause severe consequences, particularly in California, where environmental hazards significantly shape public health. Communities facing the highest pollution levels often experience elevated rates of asthma,

cardiovascular disease, premature death, and childhood developmental issues. Schools in polluted areas report higher absenteeism and lower academic performance. These effects extend beyond individual health; they influence long-term economic opportunity, strain healthcare systems, and perpetuate cycles of intergenerational disadvantage (Rentschler and Leonova; Tessum et al.).

A prime example is Sugar Hill, Los Angeles, California. Sugar Hill in the West Adams neighborhood of Los Angeles was once one of the most prominent and prosperous Black communities in California, recognized for its concentration of Black professionals, entertainers, and cultural leaders including Academy Award winner Hattie McDaniel who helped establish the neighborhood as a symbol of Black success and resistance to discriminatory housing practices (LA Conservancy). During the 1940s residents of Sugar Hill famously fought and overturned racially restrictive covenants in court, affirming their right to live in an area that white residents and realtors attempted to segregate through illegal enforcement of property restrictions (Meares). However, the prosperity and cultural strength of Sugar Hill did not protect it from the consequences of mid century urban renewal and transportation planning that routinely targeted Black and low income neighborhoods for freeway construction. The building of the Santa Monica Freeway also known as the I-10 carved directly through sections of the community, forcing the demolition of homes, displacing long-established families, and exposing remaining residents to continuous traffic emissions and elevated PM2.5 levels that disproportionately affect neighborhoods located beside major highways (Segregation by Design). Over time the freeway created both physical and social barriers that weakened local economic resources, reduced property values, and introduced long term environmental health burdens. Sugar Hill therefore stands as a clear example of how structural racism, discriminatory land use policies, and unequal

political influence allowed polluting infrastructure to be placed in historically Black communities even when these communities had demonstrated economic stability and social cohesion. The history of Sugar Hill supports the broader argument of this paper because it shows that pollution and environmental risk in California are not accidental but the direct result of power imbalances that concentrate environmental harm in low socioeconomic communities of color, a pattern that continues to shape public health outcomes and environmental inequality today (Tessum et al.).

Addressing the issue of environmental injustice is not optional, but rather essential for creating a healthier, more equitable California. Solutions must confront both environmental hazards and the structural forces that enable them. First, land-use and zoning reform is critical. Pollution burdens persist largely because harmful facilities are permitted to operate near low-income housing. California must revise zoning laws to prevent industrial development in residential neighborhoods, especially in communities historically targeted for environmental harm. Local governments must also implement buffer zones between homes and major pollution sources. Second, enforcement must be equitable and proactive. Existing environmental laws often fail because enforcement is weaker in disadvantaged areas. Stronger inspection policies, stricter penalties for violations in environmental justice communities, and transparent reporting systems are necessary to hold industries accountable.

Adding on to this, investments must prioritize historically burdened communities. Programs such as California's AB 617, which enhances air monitoring and mitigation in high-pollution areas, represent important progress. However, greater investment is needed for air filtration systems in schools, expanded access to healthcare, community-driven environmental planning, renewable energy infrastructure, and clean public transit. Community members must

be central participants in environmental decision-making processes. Fourth, structural racism must be addressed directly. Environmental reform cannot succeed without acknowledging the historical forces that allowed pollution to concentrate in certain communities. Policies must target housing inequities, transportation planning, and economic inequality. Racial equity must be embedded in environmental policy, with clear commitments to correcting past harms. Finally, data-driven accountability is essential. Pollution exposure must continue to be mapped, measured, and publicly reported. Transparency allows communities to advocate more effectively and ensures that lawmakers cannot overlook environmental disparities.

The disproportionate exposure of low-income communities in California to environmental pollution is not the result of isolated incidents or unavoidable geography. It is the cumulative outcome of global patterns of poverty, long-standing racial inequities, and land-use decisions shaped by power imbalances. Research from Rentschler and Leonova highlights how economic vulnerability drives global pollution exposure, while Alvarez demonstrates the role of structural racism in shaping environmental risk across the United States. Together, these sources reveal that environmental inequality is both systemic and solvable. Creating a healthier and more just California requires reducing pollution, reforming land-use practices, enforcing environmental regulations fairly, investing in historically burdened communities, and confronting the structures that created these inequalities in the first place. When these steps are taken, pollution will no longer be an inevitable consequence of living in a low-income neighborhood but a preventable injustice with meaningful solutions.

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