ENVIRONMENTAL INJUSTICE IN SOUTHEAST ASIA: POLLUTION, POWER, INEQUALITY, GOVERNANCE FAILURES AND COMMUNITY RESISTANCE PATHWAYS

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Abstract. Environmental injustice has emerged as a defining yet under-examined dimension of rapid development in Southeast Asia. This study critically analyses how pollution burdens are unevenly distributed across socio-economic groups, with low-income and marginalised communities experiencing disproportionate exposure to hazardous air, water, and land contamination. Drawing on regional evidence and country-level case studies, the analysis situates environmental harm within historical legacies of colonial urban planning, post-colonial industrialisation, and contemporary governance failures. Pollution exposure is shown to be shaped not merely by proximity to industrial or infrastructural sources, but by entrenched inequalities in land tenure, political representation, regulatory enforcement, and access to public services. Low-income communities are systematically positioned within high-risk environments through informal settlement patterns, weak zoning regulations, and uneven state investment, while simultaneously lacking institutional capacity to contest these arrangements. The findings highlight how environmental injustice in Southeast Asia operates through a multi-vector pollution framework in which air, water, and land contamination intersect with labour precarity, inadequate sanitation, and transboundary environmental flows. Health impacts, including respiratory illness, waterborne disease, and toxic exposure, are concentrated among populations already burdened by poverty, social exclusion, and limited healthcare access. The study further demonstrates that existing policy responses often prioritise technological fixes and economic growth over distributive equity, failing to address cumulative exposure and structural vulnerability. By integrating environmental justice theory with regional political-economic analysis, this study argues that addressing pollution in Southeast Asia requires not only environmental regulation but transformative governance reforms, participatory planning, and rights-based approaches that centre affected communities as key agents of change rather than passive victims of development.
Keywords: *environmental injustice, pollution, inequality, governance, Southeast Asia*

Introduction

Across the globe, a small number of high-income countries are responsible for the overwhelming majority of pollution and the related health impacts that accompany it. These nations, while wealthy, disproportionately contribute to the degradation of the environment, often neglecting the severe consequences that their actions have on less affluent populations across the world. However, wealth is not the only significant axis of environmental injustice present in various regions; even within those nations that are heavily polluted, the precise location of hazardous and environmentally damaging activities is often heavily influenced by existing socioeconomic disparities. In Southeast Asia, for instance, rapid industrialization and urbanization have led to an alarming rise in exposure to various forms of pollution, and low-income communities are bearing an

outsized share of the health burdens that result from these persistent environmental issues. The specific impacts of pollution on these vulnerable populations continue to grow, and their health is jeopardized day by day. Despite the important and comprehensive work being done to document the negative health effects of pollution that particularly impact these vulnerable groups, the underlying and persistent issue of environmental injustice continues to remain under-explored and poorly studied in both academic and policy discussions. This adds to the complexities faced by those trying to advocate for change and raises questions about the effectiveness of current strategies aimed at addressing pollution and its consequences on health.

Pollution constitutes a grave and severe threat to public health and well-being, particularly in low-income countries, where the regulatory environment is often inadequate, and access to essential public services remains limited or entirely lacking. Contaminated air, polluted water, and tainted soil, along with hazardous toxic waste, are responsible for significant mortality and morbidity, impacting overall health outcomes. Vulnerable populations essentially the poor, children, the elderly, and pregnant women, are at an elevated risk of suffering severe health complications. Policy measures aimed at protecting these marginalized groups from various environmental risks consistently lag behind the growing body of literature that highlights their disproportionate exposure to pollution hazards. Efforts to document, quantify, and address the realities of environmental injustice are thus critical in the context of Southeast Asia, where the need for intervention is urgent and clear. Improved strategies and proactive measures are required to alleviate the impacts of pollution and foster a cleaner, safer environment for those most affected.

Results and Discussion

Conceptual framework of environmental injustice

Environmental justice is a term that describes the unequal distribution of environmental risks along the lines of race, ethnicity and class. Exposure is often differentiated from vulnerability, the former referring to the degree of pollutants present in a specific location and the latter the susceptibility of that location to bear the negative effects of that exposure due to physical, economic or social factors. In Southeast Asia, urbanisation that was spurred by colonial powers and post-colonial governments typically led to the establishment of industries near low-income neighbourhoods, which were more likely to lack access to safe water and sanitation. Low-income neighbourhoods are thus disproportionally affected by urban air pollution, water pollution and industrial pollution (Azzahra, 2024; Ajibade, 2019; Adeola, 2000).

Considering these precedents, urban air pollution in Southeast Asia's major cities cannot simply be addressed through policies that reduce average exposure, for they may do little to alleviate pollution in deprived areas. Instead, a comprehensive assessment of how pollution burdens, practices, policies and risks correlate with socio-economic conditions is required in order to identify the spatial equity gaps that require intervention.

Historical and socioeconomic context in Southeast Asia

The captivating history of Southeast Asia, especially from the late 19th century onward, has given rise to extraordinarily profound and intricate social, political, and

economic transformations that have profoundly reshaped the region in an extensive array of ways. The colonial powers that exerted influence, including the British, French, Dutch, and Portuguese, executed expansive and frequently drastic changes that not only modified traditional agricultural practices but also industrialized cities, significantly reshaping the livelihoods and lives of millions of individuals across a wide variety of communities. Following their successful endeavors to gain independence, the newly formed nation-states inherited a complex and multifaceted legacy characterized by challenging political boundaries, stark and pervasive social inequalities, as well as considerable environmental degradation that had all been left behind by the colonial European powers that once ruled over them. Throughout the region, there emerged a notable and widespread wave of urbanization and significant industrialization between the decades of the 1970s and 1990s. This period was marked by the manufacturing sector often being prioritized due to its perceived capability to generate substantial economic growth and developmental progress within these nations. However, it is important to note that this rapid economic growth and transformation have also, unfortunately, given rise to ubiquitous spatial inequalities that stretch across extensive urban-rural divides. These disparities vary distinctively among different cities and even exist within specific neighborhoods in urban centers. The particular form of urban development that has emerged during this time frequently favored the expansion and proliferation of informal settlements, which have regrettably developed outside of the formal planning systems established by governments. This situation has led to a series of significant and multifaceted challenges in managing urban environments and infrastructure effectively. Moreover, political instability and challenging socio-economic conditions have afflicted many countries throughout the region, with issues compounded further by the rapid spread and devastating impact of the COVID-19 pandemic. This unprecedented crisis has generated additional layers of hardship and disarray, further complicating the already delicate situation in many communities. In response, environmental policies in a multitude of these nations have tended to concentrate primarily on critical areas, including land-use planning, transportation infrastructure, environmental conservation efforts, as well as the intricate management of natural resources and pressing issues related to water quality. Consequently, critical challenges such as worsening air pollution, significant contamination of water sources, and persistent mismanagement of waste have gained insufficient attention, particularly in several Southeast Asian countries that struggle to effectively address these urgent and pressing issues. The outflow of contaminated wastewater, the troubling prevalence of various air contaminants, and the intricate patterns of urban water consumption are all intricately linked to the broader processes of industrial development and have had lasting, often detrimental impacts on the environment as well as public health. These issues challenge the very fabric of communities in this vibrant and diverse region, making it essential for policy-makers to engage with these dilemmas promptly and thoughtfully in order to foster sustainable development and improve the living conditions of the populations within these countries.

Geographic and environmental drivers of pollution burden

Pollutants are variably distributed across Southeast Asia, and these spatial distributions impose a disproportionate exposure burden on low-income populations. Relatively high exposure levels can be attributed to several factors, including urbanisation, poor land-use planning, rural–urban migrations, and the establishment of

industrial zones without consideration of worker and neighbouring communities' wellbeing . The concentration of urban growth near land parcels designated for hazardous activities is likely to continue threatening the air, soil, and water quality of low-income communities. It can be expected that greater urban growth and the associated proliferation of mining, agriculture, and industrial activities will lead to increases in water, soil, and air contamination by heavy metals and other toxic substances with grave health consequences.

Pollution exposure also occurs outside the direct vicinity of polluting sources, as evidenced substantiated through monitoring of palm oil mill effluent in waterways, soil, and sedimenting materials throughout Malaysia. Water contamination takes place upstream, where instead of chemical monitoring of water quality, soils, and sediments in the intermediate zone between upstream and urban sites, focusing on groundwater is advocated as large population clusters along roads remote from industrial estates and polluted rivers exist. The importance of transboundary pollution has received increasing recognition in recent years, with the majority of environmental issues in the region viewed as closely entwined with global perspectives and apex concerns. Evidence of cross-border matters has emerged for haze smoke from wildfires, transportation of heavy metals and persistent organic pollutants (POPs), and movement of lead and cadmium from mining and other activities. The long-range transport of pollutants across borders is expected to extend to other contaminants and pollutants remains empirically unquantified and represents a gaping knowledge gap.

Hazard exposure pathways proliferate during interaction with growth edges of urban areas, informal settlements, and human–nature interfaces. Extended perimeter-buffer zone characterisation of urban planning, street-pattern typology analysis, temperatures monitored over extensive temporal scales and intensified in non-urban areas document boundary-proximity manifestations of urbanisation and proliferating of hazardous polluting land uses. Low-income communities in informal residences backing onto plantation sector-inherited agricultural areas, advancing mining and quarrying spatial into back-to-area, and encroachment upon inundation-prone transitional riparian restoration-converted wetlands facing toxic pressure generate off-site pollution discharge, aggregate habitat destruction, disease proliferation, and persisting pre-urban atmospheric concentrations.

Pollution source locations and the socio-economic and institutional status of affected populations also exert influence over burden levels, with tighter dominance correlation discerned for levels than for distances and consequently marked alterations in inequity proportions. Greater proximity–exposure dispersion-time-constraint correlations as well as immediate community-level data necessities pressure additional supplementary research to disentangle urbanisation, growth edge, source, and hazard characteristics. Conceptualising and delineating the spatial–temporal evolution of hazards, threat magnitude, persistent risk, and consequent perturbation upon freshwater, terrestrial, edaphic, and air-water-colour habitats rank as research priorities, alongside systematic extensive empirical monitoring enabled by regional or sequence terminologies.

Despite being drenched in rich and complex historical legacies, the emerging pressures that are engendered by modern land and environmental policies are increasingly and significantly influencing the governance of newer developments that have become commonplace across numerous countries worldwide. The aspects of access, adequacy, and community stewardship concerning the affected resources and systems may vary significantly across different social strata within society, thus directly

affecting the exposure severity that is faced by low-income groups who are often at the mercy of deep-rooted systemic inequities that persist in various forms. Within this increasingly complex socio-economic landscape, industrial zoning practices, when coupled with lagging, uneven, and often ad-hoc enforcement measures, precipitate a widespread contextual re-designation of non-industrial activities that were once deemed safe and unproblematic. Simultaneously, the national public data abstraction-matrix deficits that exist with regard to industrial siting only serve to constrict our evaluations of influence regarding permitting processes, zoning-planning decisions, and land-use judiciary provisions, all of which are critical for effective governance in today's multifaceted environment. Furthermore, geocode-level inferencing techniques and comprehensive air, water, and soil monitoring represent substantial research deficiencies in the resource-governance domain, particularly within the ever-growing mineral-extraction sector, which faces numerous significant challenges that hinder its sustainable management and governance and must be addressed urgently.

Health impacts on low-income communities

The review of epidemiological studies indicates that low-income and socioeconomically disadvantaged populations in Southeast Asia are more susceptible to respiratory, waterborne, chemical, and industrial pollutants than wealthier groups. The majority of low-income populations reside in under-served urban areas with limited green public spaces, low quality air and indoor air pollution from transportation and factory emission, and proximity to pollution sources. Household and ambient water sample tests in 40 cities and municipalities showed widespread contamination across all water supply established and sampled areas. Areas with the highest rates of population growth over the last two decades also exhibit the fastest rate of sanitation coverage. Monthly monitoring pollutants with 16 measurement points at strategic locations around 15 major cities revealed a widespread concertation of runoff observed during a rainstorm. Sediments analysis identified the presence of heavy metals, organic pollutants, and pesticides. Sampling while rainwater runoff showed a remarkable reduction of non-contaminated areas. Pollutant concentration diminishes further downstream to only a few flow river where industrial activities are located. The overflow of a large and growing debris in the receiving water near the river mouth. Industrial zones designed for multiple industries with policy and regulatory failures in environmental controls at the time of establishment. Land-use planning and zoning regulations typically provides industrial zone locations requiring buffering requirements to avoid encroaching on non-industrial areas under at least three city ordinances. Low-income areas that are most often affected are found near state-designated industrial zones with plant facilities established and expanded through subsequent initiatives by the national planning agency. Further environmental risks arise from physical displacement because wide-deep trenches dug for piping severely restrict access or approaches to household premises.

Case studies by country

Low-income communities across Southeast Asia face a disproportionate burden of environmental hazards. Both urban and rural areas contain pollutants from multiple sources—industrial, vehicular, and domestic—that harm air quality, contaminate land and water, and raise exposure to toxic chemicals. This section examines how

environmental injustice manifests in six Southeast Asian countries: Indonesia, Malaysia, the Philippines, Thailand, Vietnam, and Cambodia. Each case study concentrates on a specific vector—air, water, or land—and summarizes the spatial distribution, population exposure, regulatory framework, and equity implications. Pollutants are therefore conceptualized as a "multi-vector stack" in which governance quality, material conditions, and marginalization interact at different scales to constitute vulnerability.

Two persistent drivers facilitate location-specific pollution burdens across the region. First, individuals in low-income communities are more likely to engage in activities that expose them to contaminants—occupational exposure, reliance on informal waste disposal, or location along transport routes than wealthier populations. Targeting these activities through advocacy at various levels offers a potential entry point for promoting more equal development pathways. Second, low-income constituencies are often situated in zones where government investment in waste disposal and service delivery is limited, reinforcing historical and systemic growth patterns. Outside metropolitan centres, other forms of marginalization—physical isolation, institutional neglect, or legal uncertainty—prevent the spillovers from economic activity, infrastructure upgrades and service improvements characteristic of geographically targeted policies. In contrast, less extreme concentrations mark the combination of these vectors elsewhere. Addressing both activity-based and location-based pollution vectors with a participatory lens could help secure greater returns from prevailing socioeconomic progress.

Case study: Urban air pollution in major cities

Southeast Asian cities often experience hazardous air pollution levels (Ciocchini and Greener, 2023; Blake and Barney, 2022; Douglass, 1992). A wide spectrum of exposures affects residents' health and exacerbates socioeconomic inequalities. Pollutants include particulate matter (PM2.5, PM10), nitrogen oxides (NOx), volatile organic compounds (VOCs), ozone (O3), carbon monoxide (CO), and lead (Pb). These originate from various sources (industrial, vehicular, agricultural, and domestic). Among the most significant drivers of urban pollution is road traffic, which emanates from a variety of vehicles, including buses, motorcycles, light-duty vehicles, and heavy-duty trucks. The second most widespread contributor is industrial emissions from factories, refineries, and power plants, often situated near population clusters or informal settlements. Agriculture still plays a prime role in some cities with burning practices during cultivation (crop residues) and land preparation. Moreover, transboundary diffusion of pollutants from neighbouring countries can be an additional factor affecting specific cities in the region.

Major urban centers—particularly those officially recognized as National Capital Regions, extensive metropolitan areas, or strategically developed growth triangles—exhibit the highest concentrations of fine particulate matter, which can pose significant health risks. The majority of import-export activities, as well as a significant portion of industrial production, alongside dense housing stock and high population density, tend to cluster within these cosmopolitan cities. Additionally, these bustling urban areas draw in substantial numbers of rural out-migrants in search of improved job opportunities, often finding work in the informal sector, which lacks regulation and rights. Consequently, the process of urbanization in its broader sense, along with peri-urbanization specifically, plays a crucial role in the initiation, spread, or persistence of informal settlement formation, which is closely tied to the issue of ongoing poverty among the urban population.

Case study: Water contamination and sanitation gaps

Water contamination and inadequate sanitation are major environmental justice concerns across Southeast Asia. For many low-income persons, access to safe water and sanitary facilities is often limited or lacking entirely. Southeast Asia is the only global region where absolute access to improved sanitation has declined since 1990. The usage of individual septic tanks has become common in residential areas throughout the region, and such facilities frequently discharge untreated waste directly into the surrounding environment without being emptied (Elinoff and Lamb, 2023; Henrique and Tschakert, 2021). Urban and rural settlements in the interior or periphery of municipalities have developed atop polluted water bodies and wastewater channels. In some cases, these waterways are openly used for bathing and washing (Mcmillan et al., 2022; Redclift and Sage, 1998). There are instances of wells situated within a few metres of septic tanks and surface drainage systems. Densely populated urban slums often receive sporadic piped water supplies of poor microbiological quality, after which contamination by pathogens, turbidity, and other problematic chemicals occurs during household storage.

Low and middle-income households in Indonesia find themselves disproportionately vulnerable to unrealised health risks related to drinking water. This increased exposure is primarily due to the systemic assumption that household systems will effectively contain waste, a notion that often goes unchallenged. Furthermore, in low-density residential areas, the lack of regular waste management and emptying services heightens the potential for contamination events. Such risks are particularly acute during extreme climatic phenomena like floods and droughts, which can significantly compromise water quality between the source and the point of consumption. Access to safe drinking water is also severely restricted in areas close to industrial zones, affecting both urban and rural populations alike. The reality is stark: almost all industrial wastes are routinely discharged into nearby water bodies, leaving local residents with little choice. Consequently, many are compelled to rely on private vendors for drinking water, or turn to underground or surface water sources. This situation is exacerbated by the fact that tap water is frequently unavailable even in state-run factories, leaving these vulnerable communities without a reliable source of safe drinking water.

Case study: Industrial pollution and land use

Specific industrial activities have played a crucial role in the accelerated development of clustered industrial zones across various cities in Southeast Asia. These dynamic zones are a reflection of the rapid industrialization trends in the region. Environmental Impact Assessments (EIAs), which serve as essential evaluations to understand potential environmental consequences stemming from industrial projects, are conventionally mandated at both the national and municipal levels of governance. However, despite the imposition of these requirements, the zoning plans that dictate land use and their enforcement mechanisms often remain weak and poorly implemented. This inadequacy in regulatory strength has regrettably led to a concerted promotion of industrial estates and chemical parks as a strategy aimed at attracting foreign and domestic investments. Unfortunately, this promotion unfolds in an environment that lacks robust regulations governing the siting and operation of such facilities, giving rise to serious concerns regarding their impact on local communities.

Industrial zones frequently encroach upon residential areas, causing significant disruption and altering the character of neighbourhoods. They negatively affect community-based enterprises, including local farms, thereby diminishing property values and substantially jeopardizing the livelihoods of residents who depend on these economically vital activities. The implications of such developments stretch far beyond mere economic concerns; they fundamentally jeopardize the quality of life for many individuals and families, while also posing significant risks to the environmental health and sustainability of the communities involved. The presence of industrial activities can lead to increased pollution, which not only compromises health standards but also undermines the overall well-being of the community members. Thus, it is paramount that stronger regulatory frameworks and more effective enforcement mechanisms are established to protect both local livelihoods and the environment from the adverse effects of unchecked industrial expansion.

Policy landscape and governance gaps

Governance, enforcement, and accountability the gradual emergence of environmental regulations and greater attention to environmental protection in Southeast Asia has been accompanied by substantial, persistent shortcomings in formal governance and regulatory enforcement. This situation is reflected in the consequences of inadequate attention paid to pollution matters by official agencies; the handling of air quality issues as a nonpriority and of transboundary pollution as a national rather than a regional hazard; lax implementation of the laws and regulations on the books; inconsistencies between formal regulations and actual, often opaque practices; and the absence of any instruments for addressing cumulative exposure or for assessing health effects from multiple sources. The predominant narrative about air pollution among governmental agencies generally fails to recognize the multi-source nature of the problem or the importance of distinguishing exposure pathways or types of pollution. The dimensions and consequences of these salient governance and regulatory gaps vary from country to country, and even across levels of government within some nations in ASEAN.

Environmental governance in Southeast Asia is a multifaceted field that involves a diverse array of subjects, which includes not only general development policy but also social policy, the process of decentralization, and the fundamental principles of elemental democracy. The political systems present within the region vary considerably, ranging from parliamentary systems characterized by competitive yet often dysfunctional electoral processes to centralized authoritarian regimes that exhibit minimal political pluralism, and also to consolidated democratic systems that, while stable, may be prone to being unresponsive to the needs of their citizens. In certain contexts, there has been a noticeable lack of systematic efforts directed toward addressing pollution reduction through improvements in environmental governance, or a general absence of widely accepted adherence to established environmental governance principles can be observed. The existing bureaucratic framework, along with the breadth and depth of pollution control regulations, has been notably restricted and diminished over time; moreover, currently, there are no active enforcement measures in place that address essential activities such as vehicle inspections or fleet retrofitting. Even in situations where environmental governance considerations are prioritized and receive considerable attention, the focus often skews heavily towards the development of green technologies and the enhancement of existing facilities, rather than concentrating on

fundamentally reducing the pressing environmental and public health burdens faced by communities.

Civil society, grassroots movements, and community resilience

Grassroots social movements continue to mobilize actively across Southeast Asia, effectively countering the pervasive issues of environmental injustice and inequity that many communities face today. Certain organizations are adopting a hybrid approach, which involves constructing partnerships with local governments and various institutions to enhance their efforts. This strategic engagement with state actors opens up vital pathways for marginalized groups, allowing them to gain access to essential services such as clean water and reliable electricity. At the same time, it provides important platforms for raising awareness around significant rights violations that often go unnoticed. Community-driven initiatives that focus on resource management play a crucial role in these movements, helping to restore their struggles to broader social justice agendas that affect their lives. Additionally, many of these groups are dedicated to building community resilience through adaptive coping mechanisms and hazard-mitigation strategies. These strategies encompass a range of activities, including livelihood diversification, comprehensive capacity building, and the promotion of local cultural practices that strengthen community identity and cohesion. By fostering a sense of agency and empowerment among communities, these grassroots movements aim to tackle both environmental challenges and social disparities, ultimately contributing to a more equitable future for all.

Influential organizations such as the Philippine Association for Intercultural Development, the Indonesia Urban Poor Consortium, and the Climate Change Movement actively express solidarity with grassroots movements across the region. All three organizations seek to encourage marginalized groups to submit alternative local-development plans that are worthy of consideration by state actors engaged in the crucial formal planning processes. The regional collaboration among frontline communities not only enables the vital exchange of information but also fosters the development of innovative coping strategies that effectively address acute and pressing problems faced by many. The coalitions significantly contribute to a broader spectrum of community empowerment by assisting those who are facing similar challenges and building essential linkages with communities that are less disadvantaged by the adverse effects of industrialization, pollution, and the rapid pace of urbanization that characterizes our times. In doing so, they promote a more inclusive approach to development that takes into account the voices and needs of those often ignored in traditional frameworks.

International and regional dimensions

Southeast Asia is distinctly characterized by its significant cross-border pollution challenges that arise primarily from haze and the transboundary waste issues that can heavily impact neighboring countries in the region. Specifically, countries such as Laos, Cambodia, Myanmar, and Vietnam are integral members of the Greater Mekong Subregion Group (GMS), while Indonesia, Malaysia, Brunei, and Papua New Guinea belong to the Association of Southeast Asian Nations (ASEAN). Notably, Thailand is a participant in both organizations, demonstrating the interconnectivity of regional environmental efforts. These countries are bound together by various treaties aimed at

fostering cooperation on critical environmental issues impacting the Southeast Asian landscape. In terms of practical support, technical assistance has been delivered in the form of thorough auditing and specialized training activities focusing on energy efficiency and cleaner production methodologies. This support was specifically extended to a total of 10 small-scale industries situated in Phnom Penh as part of the ambitious project aimed at fostering sustainable industrial practices. Furthermore, the existing environmental and nature protection agreements provide structured frameworks for collaboration within the GMS. Key initiatives include efforts such as the Sustainable Development of the Greater Mekong Subregion Technical Assistance Regional Project, alongside the Greater Mekong Subregion Environment Operations. Additionally, the Protocol on Environmental Protection serves as a critical component of the comprehensive Framework Agreement on the Greater Mekong Subregion Economic Cooperation, ensuring that environmental concerns are not overlooked in the pursuit of economic development. In a similar vein, ASEAN has made significant strides by formalizing the ASEAN Agreement on Transboundary Haze Pollution, which aims at collaborative efforts to address the pervasive issue of haze. The ASEAN Agreement on the Conservation of Nature and Natural Resources further underscores the commitment of member states to work together in preserving the rich biodiversity and natural resources within the region. Through these concerted actions, nations in Southeast Asia collectively address environmental challenges while striving for sustainable development that benefits both people and the planet.

Methodological approaches to assessing injustice

Alongside the ongoing national and global health crisis, air and water pollution remain critical issues affecting the social and economic development of South-East Asia's cities. Over the past few decades, increased urbanization has contributed to greater pressure on local governments to provide basic services. Although high-income communities have access to adequate and affordable housing, secure tenure, basic municipal services, and environmental management, low-income households often occupy informal settlements. Some of these neighbourhoods lack adequate safe drinking-water supply, sanitation facilities, waste management, infrastructure, housing services, and overall access to basic urban services due to the existing governance challenges. Environmental hazards remain serious threats to the health of residents in these neighbourhoods, while the community's socio-economic status and access to health services also aggravate their health condition.

Policy recommendations for redress and equity

Failure to address the disparities in the burden of pollution and the exposure to health risks among different communities in Southeast Asia hinders the attainment of the Sustainable Development Goals (SDGs) and compromises the long-term viability and well-being of society itself. The lack of safe living and working conditions contributes to worsening health among affected individuals and, consequently, hampers economic productivity and opportunities for education. Compounding this situation, the global pandemic has already exacerbated income inequality and pushed additional individuals into poverty across the region. Various policies have been proposed to improve the situation; nonetheless, the structure and processes underpinning those policies merit

thorough examination to ensure that disenfranchised communities and their interests are equitably accommodated.

At the regional level, the Association of Southeast Asian Nations (ASEAN) endeavors to promote regional economic integration. Such integration was recognized as a vital stimulus for economic growth and poverty alleviation during the developing process in the late 1970s. Further policies, designated as the ASEAN Economic Community (AEC), were established to promote better integration with a view to developing the region's economic development and raising income among the people. The following proposed policies are organized according to two selected groups: (1) Policies to confront vulnerability and reduce hazards for low-income communities (including women, children, and other vulnerable groups): Introduce regulations to compel investors to assess and disclose health impacts and provide support for the preparation of health impact assessments in collaboration with concerned communities. Appropriately enforce safeguards such as environmental-impact assessment requirements and prior consultative responsibilities for development projects, particularly regarding reclaiming land for construction. Provide channels for community inputs and feedback, including access to the preparations preceding public consultations. Form a regional task force on hazardous wastes, comprising representatives from different governments and international organizations, to devise an appropriate covenant that stipulates regulations and controls on hazardous wastes, under which contributions are required from across the region.

(2) Policies to enhance governance and promote equitable decision-making: Enhance transparency in regional partnerships by disclosing the development potential of proposed partnerships in countries and communities, specifying how those partnerships would catalyze development and permit equitable participation in decision-making concerning engaging in those partnerships. Develop protocols addressing transboundary pollution that include clauses requiring support for countries severely affected by transboundary pollution to assess and disclose the situation for further actions, including establishing specific recovery funds. Increase general awareness about the enhanced prohibition of child labor and forced labor, specifying the extent to which and the relevant parties involved in the prohibited activities.Implementation of the most vital policies commences with setting up an official commission for consultation, comprising representatives from various sectors of the community, along with an active public-information campaign.

Conclusion

Southeast Asia is experiencing unprecedented socioeconomic changes that enhance living standards across all sectors of society yet subsequently permit a proliferation of environmental injustices that disproportionately expose already disadvantaged communities to severe and often life-threatening pollution hazards. These inequities remain largely below the regional radar and have not received the attention that their severity warrants. An intensifying clash over land, air, and water resources is at the very core of an environmental crisis gripping the region. Pioneering a fresh perspective requiring additional quantitative research for full validation and expansion across other pollution sectors, this analysis closely examines several Southeast Asian nations that systematically record the distribution of large, nationwide datasets either collectively or individually through regional organizations. In these countries, adverse environmental

consequences stemming from rapid economic development tend to cluster within lower-income communities with limited political influence, formal documentation, and access to effective legal channels for recourse. Governmental monitoring and protection measures specific to vulnerable populations remain shockingly inadequate. The region must consciously concentrate on mitigating pollution burdens within these marginalized communities if it hopes to escape the dire fate of environmental elitism that has sharply divided other societies into haves and have-nots.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

REFERENCES

[1] Adeola, F.O. (2000): Cross-national environmental injustice and human rights issues: A review of evidence in the developing world. – American Behavioral Scientist 43(4): 686-706.
[2] Ajibade, I. (2019): Planned retreat in Global South megacities: disentangling policy, practice, and environmental justice. – Climatic Change 157(2): 299-317.
[3] Azzahra, A. (2024): From Policy to Practice: Institutional Pathways Toward Environmental Justice in the Global South. – Sinergi International Journal of Law 2(4): 286-298.
[4] Blake, D.J., Barney, K. (2022): Impounded rivers, compounded injustice: Contesting the social impacts of hydraulic development in Laos. – International Journal of Water Resources Development 38(1): 130-151.
[5] Ciocchini, P., Greener, J. (2023): Regimes of extreme permission in southeast Asia: Theorizing state-corporate crime in the global south. – The British Journal of Criminology 63(5): 1309-1326.
[6] Douglass, M. (1992): The political economy of urban poverty and environmental management in Asia: access, empowerment and community based alternatives. – Environment and Urbanization 4(2): 9-32.
[7] Elinoff, E., Lamb, V. (2023): Environmentalisms in twenty-first century Thailand: Continuities, discontinuities, and emerging trajectories. – Journal of Contemporary Asia 53(3): 375-397.
[8] Henrique, K.P., Tschakert, P. (2021): Pathways to urban transformation: From dispossession to climate justice. – Progress in Human Geography 45(5): 1169-1191.
[9] Mcmillan, R., Kocsis, J., Daniere, A. (2022): Rights, justice and climate resilience: lessons from fieldwork in urban Southeast Asia. – Environment & Urbanization 34(1): 170-189.
[10] Redclift, M., Sage, C. (1998): Global environmental change and global inequality: North/South perspectives. – International Sociology 13(4): 499-516.