INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 09, September 2025, pp : 1252-1258
www.ijprems.com
editor@ijprems.com
e-ISSN : 2583-1062
Impact Factor : 7.001

ENVIRONMENTAL POLLUTION: CAUSES, IMPACTS, AND SUSTAINABLE SOLUTIONS

K.I.I.B. Kulathunga[1]

[1]Environmental Officer, Central Environmental Authority, North Central Provincial Office, Anuradhapura, Sri Lanka.

ABSTRACT

Environmental pollution has emerged as one of the most critical global challenges of the 21st century, with far-reaching consequences for human health, ecosystems, and sustainable development. The exponential rise in industrialization, urbanization, and population growth has resulted in unprecedented levels of air, water, soil, noise, light, and plastic pollution. These forms of pollution are intricately linked, intensifying climate change, biodiversity loss, and economic instability. This article provides a comprehensive review of pollution dynamics across global, South Asian, and Sri Lankan contexts. Through an interdisciplinary lens, the study examines sources, types, and consequences of pollution, focusing on impacts on human health and ecosystems, while also analyzing policy responses and sustainable solutions. Findings underscore that while global efforts—such as the Paris Agreement and United Nations Sustainable Development Goals—are critical, region-specific approaches are equally necessary. In particular, South Asian countries face unique challenges due to rapid urbanization, weak governance, and limited infrastructure for pollution control. The article argues for integrated, science-based, and participatory approaches to pollution management, highlighting the importance of policy enforcement, technological innovation, and community engagement. Ultimately, mitigating pollution is essential not only for environmental sustainability but also for safeguarding public health and ensuring socio-economic resilience.

Keywords: Environmental Pollution, Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Sustainable Solutions.

1. INTRODUCTION

1.1. Background

Environmental pollution has emerged as one of the most pressing challenges of the 21st century. It refers to the introduction of harmful substances, energy, or agents into the natural environment, resulting in deleterious effects on ecosystems, biodiversity, and human health (Smith, 2020). Historically, environmental pollution can be traced to the Industrial Revolution, when fossil fuel combustion, mechanized manufacturing, and urban expansion released unprecedented amounts of waste into the air, water, and soil (Weart, 2008). In the modern era, rapid globalization, population growth, and industrial expansion have intensified these pressures, making pollution a global issue that transcends national boundaries (United Nations Environment Programme [UNEP], 2021).

Today, virtually every environmental system—air, freshwater, marine ecosystems, terrestrial soils, and even space—shows signs of contamination. These pollutants may be physical (plastic debris, noise, radiation), chemical (pesticides, heavy metals, industrial effluents), or biological (untreated sewage, pathogenic organisms) (Galloway et al., 2017). Unlike natural hazards, pollution is primarily anthropogenic, meaning its sources are largely human-driven and, therefore, preventable through policy, technology, and behavioral change.

1.2. Global Environmental Challenges

Globally, environmental pollution is recognized as a critical public health crisis. According to the World Health Organization (2021), over seven million premature deaths annually are attributable to outdoor and indoor air pollution. Water pollution affects billions of people worldwide, with an estimated 2.2 billion lacking access to safely managed drinking water, resulting in diseases such as diarrhea, cholera, and hepatitis (UNICEF & WHO, 2019). Soil contamination through heavy metals, pesticides, and synthetic fertilizers undermines agricultural productivity, reduces food security, and contributes to chronic health risks (FAO, 2020).

Emerging pollutants such as plastics and microplastics have gained significant attention due to their persistence and bioaccumulation potential. More than 8.3 billion tons of plastics have been produced since the 1950s, with much of it entering terrestrial and marine ecosystems, causing physical harm and introducing toxic compounds into the food web (Geyer et al., 2017; Wright & Kelly, 2017). Noise and light pollution, though less studied, are increasingly recognized for their health impacts and ecological disruptions, affecting human circadian rhythms, wildlife behavior, and reproductive success (Basner et al., 2014; Gaston et al., 2013).

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 09, September 2025, pp : 1252-1258
www.ijprems.com
editor@ijprems.com
e-ISSN : 2583-1062
Impact Factor : 7.001

1.2. Regional Perspectives: South Asia and Sri Lanka

South Asia represents a region of heightened vulnerability to pollution due to rapid population growth, urban expansion, industrialization, and high dependency on agriculture. Urban centers like Delhi, Dhaka, and Karachi consistently experience PM2.5 concentrations far above WHO safe limits, primarily due to vehicular emissions, coal-based energy production, and biomass burning (IQAir, 2023). Water systems in the region, including the Ganges, Yamuna, and Kelani rivers, suffer from untreated sewage discharge, agricultural runoff, and industrial effluents, affecting both human health and aquatic biodiversity (Khan et al., 2019; Herath et al., 2021).

Sri Lanka, while comparatively better in air quality, faces mounting challenges in urban and coastal pollution. Colombo and Kandy have rising particulate matter levels due to vehicular traffic and small-scale industries (Kumara & Rathnasiri, 2020). Coastal zones experience plastic pollution exacerbated by tourism, fishing, and maritime incidents, such as the X-Press Pearl disaster, which released massive amounts of plastic nurdles into the Indian Ocean (Fernando et al., 2022). Additionally, overuse of chemical fertilizers and pesticides has led to soil degradation and increased chronic kidney disease prevalence in agricultural regions (Jayasumana et al., 2015).

2. LITERATURE REVIEW

2.1. Air Pollution

Air pollution is a widespread environmental issue caused by the presence of harmful gases, particulate matter, and volatile organic compounds in the atmosphere, with key pollutants including PM2.5, PM10, nitrogen oxides (NOx), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and black carbon (Brauer et al., 2016). The main sources of these pollutants vary by region but generally include vehicular emissions, coal-fired power plants, industrial manufacturing, biomass burning, and construction activities. Long-term exposure to fine particulate matter is linked to serious health consequences such as cardiovascular and respiratory diseases, including asthma, chronic obstructive pulmonary disease (COPD), and lung cancer (Kelly & Fussell, 2017). Vulnerable groups, particularly children and the elderly in low- and middle-income countries, are more susceptible due to weaker physiological resilience (Balakrishnan et al., 2019). In Sri Lanka, urban areas show rising cases of respiratory illnesses, especially during periods of heavy vehicular traffic and industrial emissions (Kumara & Rathnasiri, 2020).

On a regional scale, South Asian megacities are among the most polluted globally, with Delhi, Dhaka, and Karachi frequently exceeding PM2.5 safety thresholds by more than tenfold (IQAir, 2023). Seasonal agricultural residue burning in northern India and Pakistan contributes significantly to regional smog episodes, while industrial emissions aggravate both local and transboundary pollution (Lelieveld et al., 2019). In Sri Lanka, Colombo and Kandy are particularly affected, with increasing particulate matter levels driven by vehicular emissions, urban congestion, and small-scale industrial activity (Karunathilake et al., 2020). These trends highlight the urgent need for effective policy interventions, cross-border cooperation, and sustainable urban planning to address the growing threat of air pollution in South Asia.

2.2. Water Pollution

Water pollution occurs when freshwater and marine systems are contaminated by chemical, biological, and physical pollutants, posing serious threats to both ecosystems and human health. Major contributors include industrial effluents, sewage discharge, agricultural runoff, heavy metals, and plastics (Gupta et al., 2019). The consequences are severe, as contaminated water is a major cause of waterborne diseases such as diarrhea, cholera, hepatitis, and dysentery, with over 2 billion people worldwide lacking access to safe drinking water (UNICEF & WHO, 2019). In addition, heavy metals and chemical pollutants are linked to chronic kidney disease, neurological disorders, and even cancer, highlighting the long-term health risks of poor water quality (Rahman et al., 2021; Jayasumana et al., 2015).

On a regional scale, water pollution is a pressing issue in South Asia, where rivers such as the Ganges, Yamuna, and Brahmaputra are heavily contaminated, endangering millions of people and their ecosystems (Khan et al., 2019). In Sri Lanka, reservoirs and rivers face significant pollution from agricultural chemicals, industrial waste, and plastic debris, leading to eutrophication and harmful algal blooms that threaten biodiversity and water supply (Herath et al., 2021). The 2021 X-Press Pearl maritime disaster further exposed the vulnerability of Sri Lanka's marine ecosystems to sudden and large-scale pollution events, especially through plastic contamination (Fernando et al., 2022).

2.3. Soil Pollution

Soil contamination results from the accumulation of heavy metals, persistent organic pollutants, pesticides, and excessive fertilizers, posing significant risks to agricultural productivity, food security, and human health (FAO, 2020). Contaminants such as lead, cadmium, and arsenic can bioaccumulate in crops and subsequently enter the

human and animal food chain, leading to chronic health problems, including neurological disorders, kidney damage, and other long-term illnesses (Luo et al., 2012).

In South Asia, intensive farming practices with excessive fertilizer and pesticide application have accelerated soil degradation and reduced microbial biodiversity, further undermining soil health and sustainability (Singh et al., 2018). In Sri Lanka, prolonged reliance on chemical fertilizers has contributed to soil acidification, nutrient depletion, and widespread contamination of paddy fields, raising concerns about both agricultural productivity and human exposure to harmful substances (Wijesekara et al., 2016).

2.4. Noise Pollution

Noise pollution is an increasingly recognized environmental stressor that negatively impacts both human health and wildlife behavior. Its primary sources include rapid urbanization, heavy traffic, industrial activity, and construction, all of which contribute to elevated noise levels in modern environments (Basner et al., 2014). For humans, chronic exposure to high noise levels is strongly associated with cardiovascular diseases, hypertension, sleep disturbances, stress, and reduced cognitive performance, with South Asian cities such as Delhi, Mumbai, and Colombo reporting particularly high ambient noise due to traffic congestion and rapid urban expansion (Mukherjee, 2015; Perera & Weerasinghe, 2019).

Beyond human health, noise pollution also poses serious threats to ecological systems by disrupting wildlife communication, altering mating behaviors, and interfering with predator-prey dynamics. Such disturbances can create cascading effects on ecosystem stability, reducing biodiversity and altering natural interactions essential for ecological balance (Francis & Barber, 2013).

2.5. Plastic and Microplastic Pollution

Plastic pollution has become one of the most pressing environmental challenges of the 21st century, largely due to the widespread use of plastics in packaging, agriculture, and industry. These synthetic polymers are highly durable and resistant to natural degradation, leading to their persistent accumulation in both terrestrial and marine ecosystems (Geyer et al., 2017). The scale of plastic production and consumption has outpaced waste management systems, resulting in significant environmental leakage and global distribution of plastic debris.

The sources of plastic pollution are diverse, ranging from primary sources such as single-use packaging, fishing gear, industrial nurdles, and microbeads in personal care products to secondary sources generated by the fragmentation of larger debris into microplastics (<5 mm). These microplastics infiltrate soils, rivers, and oceans, with coastal regions and river mouths serving as major accumulation hotspots (Jambeck et al., 2015). Alarmingly, microplastics have also been detected in remote regions such as Arctic ice and deep ocean sediments, underscoring the transboundary nature of the problem (Obbard et al., 2014).

The impacts of plastic pollution extend to both human health and ecosystems. Humans are exposed to microplastics primarily through seafood consumption, drinking water, and inhalation, with studies linking them to oxidative stress, inflammatory responses, and endocrine disruption (Wright & Kelly, 2017; Sharma et al., 2020). Certain plastic additives, such as bisphenol-A and phthalates, have been associated with reproductive and developmental disorders, highlighting long-term health risks.

Ecologically, plastics harm marine and terrestrial organisms through ingestion, entanglement, and habitat modification, with microplastics consumed by plankton and transferred up the food chain, causing physiological stress and mortality in fish, birds, and mammals (Galloway et al., 2017). In Sri Lanka, coastal areas such as Mount Lavinia and Negombo have reported alarming levels of microplastic contamination, largely driven by tourism, fishing activities, and inadequate waste management systems (Athapattu et al., 2021).

3. RESULTS AND DISCUSSION

3.1. Global Context

Globally, environmental pollution has emerged as a complex crisis that simultaneously threatens ecological integrity and public health. Air pollution alone is responsible for more than seven million premature deaths annually (WHO, 2021), while water pollution leaves over two billion people without access to safe drinking water, driving frequent outbreaks of diseases such as cholera and dysentery (UNICEF & WHO, 2019). Soil degradation further compounds the problem, undermining global food security as more than one-third of arable land is affected by erosion, salinization, and chemical contamination (FAO, 2020). Adding to these concerns, plastic pollution has escalated at an alarming rate, with an estimated 11 million metric tons entering the oceans every year, severely threatening marine biodiversity and ecosystem services essential for human well-being (Lebreton & Andrady, 2019).

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 09, September 2025, pp : 1252-1258
www.ijprems.com
editor@ijprems.com
e-ISSN : 2583-1062
Impact Factor : 7.001

Although less visible, noise and light pollution also exert significant environmental and health impacts. Chronic exposure to high noise levels is linked to cardiovascular diseases, elevated stress, and impaired cognitive functioning (Basner et al., 2014), while light pollution disrupts circadian rhythms, alters reproductive cycles, and interferes with the natural behaviors of wildlife (Gaston et al., 2013). Collectively, these forms of pollution not only intensify public health risks but also exacerbate climate change by altering atmospheric chemistry and weakening natural carbon sinks, highlighting the urgent need for integrated global action (IPCC, 2023).

3.2. South Asian and Sri Lankan Context

South Asia, home to nearly one-fourth of the world's population, is under severe environmental stress driven by rapid urbanization, industrialization, and high-density agriculture. Air pollution remains one of the most pressing issues, with cities such as Delhi, Dhaka, and Lahore recording annual average PM2.5 concentrations above 100 µg/m³—ten times higher than the WHO's safe threshold of 10 µg/m³ (IQAir, 2023). Seasonal crop residue burning, vehicular traffic, and unchecked industrial emissions intensify this crisis across the region (Lelieveld et al., 2019). Water pollution presents another critical challenge, as rivers and reservoirs are contaminated by untreated sewage, industrial effluents, and agrochemical runoff. In Sri Lanka, elevated nitrate levels and pesticide residues in drinking water have been strongly associated with chronic kidney disease of unknown etiology (CKDu), particularly in the North Central Province (Jayasumana et al., 2015). Additionally, marine ecosystems and fisheries face significant threats from coastal pollution, including plastics and oil spills (Fernando et al., 2022).

Emerging forms of pollution such as noise and light are also becoming major concerns, especially in densely populated cities and tourist-heavy coastal zones. In Colombo, persistent traffic congestion generates harmful levels of noise, contributing to stress and sleep disorders among residents. Meanwhile, artificial lighting in urban and coastal areas disrupts natural ecological cycles, with documented impacts on sea turtle nesting behaviors and bird migration patterns (Perera & Karunarathna, 2020). Together, these environmental challenges illustrate the urgent need for South Asian nations to adopt integrated pollution management strategies that balance economic growth with ecological sustainability and human well-being.

3.3. Impacts on Human Health

Environmental pollution exerts both direct and indirect impacts on human health through multiple pathways. Air pollution is strongly linked to respiratory and cardiovascular diseases, lung cancer, stroke, and reduced life expectancy, with children, the elderly, and individuals with pre-existing conditions being the most vulnerable (Cohen et al., 2017). Water pollution causes widespread health problems, including diarrheal diseases, chronic kidney disease of unknown etiology (CKDu), and heavy metal poisoning, with South Asia particularly affected by high concentrations of arsenic, fluoride, and nitrates in drinking water (Jayasumana et al., 2015; Rahman et al., 2021). Soil contamination contributes further risks, as heavy metals accumulated in crops can enter the food chain, leading to chronic toxicity, developmental disorders, and organ damage (Luo et al., 2012). Noise and light pollution also undermine health, as chronic exposure elevates stress hormones, contributes to hypertension, disrupts sleep, and raises the risk of metabolic disorders (Basner et al., 2014; Cho et al., 2015). Additionally, plastic pollution poses emerging threats, with microplastics and associated additives linked to endocrine disruption, inflammation, and oxidative stress, highlighting the complex and interconnected nature of pollution-related health risks (Wright & Kelly, 2017).

3.4. Impacts on Ecosystems

Pollution destabilizes ecosystems across terrestrial, freshwater, and marine environments through a variety of mechanisms. In terrestrial ecosystems, acid rain, soil contamination, and pesticide use reduce soil fertility, disrupt microbial communities, and threaten plant biodiversity (Driscoll et al., 2001; FAO, 2020). Freshwater systems are affected by nutrient runoff that causes eutrophication, leading to hypoxic zones, fish kills, and degraded water quality (Diaz & Rosenberg, 2008). Marine ecosystems suffer from plastic pollution, where ingestion and entanglement harm fish, seabirds, and marine mammals, while microplastics bioaccumulate through food webs, causing physiological and reproductive stress (Galloway et al., 2017). Additionally, noise and light pollution interfere with animal communication, predation, reproduction, and migration patterns, further destabilizing ecosystem functioning and biodiversity (Francis & Barber, 2013; Gaston et al., 2013).

3.6 Policy Responses and Sustainable Solutions

Effective pollution mitigation requires coordinated strategies across global, regional, and local scales. At the global level, frameworks such as the Paris Agreement, the Basel Convention, and the Sustainable Development Goals (SDGs) provide guidance for reducing emissions, managing waste, and promoting sustainable development (UNFCCC, 2015; UN, 2015). In South Asia, initiatives such as India's National Clean Air Programme (NCAP), Pakistan's environmental regulations, and regional efforts led by the South Asia Co-operative Environment

Programme (SACEP) aim to curb pollution and improve environmental monitoring (Ministry of Environment, Forest & Climate Change, 2019). At the national level in Sri Lanka, measures including plastic bans, wastewater treatment projects, coastal zone management, and marine pollution monitoring by the Marine Environment Protection Authority (MEPA) target key environmental threats (Fernando et al., 2022). Complementing these policy efforts, technological and community-based solutions—such as renewable energy adoption, waste-to-energy systems, green infrastructure, sustainable agriculture, and NGO-driven awareness campaigns—play a critical role in reducing pollution. Holistic approaches that integrate policy, scientific innovation, and active local participation are essential to achieving measurable and lasting improvements in environmental quality (Tilman et al., 2011; Weerakoon, 2021).

4. CONCLUSION

Environmental pollution represents a complex, multi-dimensional crisis with profound consequences for human health, ecosystems, and sustainable development. The comprehensive review presented in this study highlights the pervasive impacts of air, water, soil, noise, light, and plastic/microplastic pollution, demonstrating how anthropogenic activities—from industrialization to intensive agriculture—exacerbate environmental degradation.

Globally, pollution contributes to millions of premature deaths annually, threatens freshwater and marine ecosystems, and undermines food security. In South Asia, rapid urbanization, population growth, and industrial expansion amplify exposure to multiple pollutants. Countries such as India, Pakistan, Bangladesh, and Sri Lanka face severe challenges related to air and water quality, soil contamination, and marine plastic pollution. In Sri Lanka, specific concerns include urban air pollution in Colombo, CKDu linked to agrochemical contamination, coastal microplastic accumulation, and biodiversity disruption due to noise and light pollution.

Pollution affects human health through a spectrum of respiratory, cardiovascular, renal, neurological, and metabolic disorders. Vulnerable populations, including children, the elderly, and agricultural workers, bear the highest burden. Ecosystems experience diminished resilience and biodiversity, with acid rain, eutrophication, soil degradation, microplastic accumulation, and disruption of wildlife behaviors being some of the major consequences.

Policy responses, though increasingly comprehensive, require enhanced enforcement, monitoring, and community engagement. Global frameworks such as the Paris Agreement and SDGs provide critical guidance, while South Asian initiatives and Sri Lankan environmental regulations demonstrate regional commitment. However, technological innovation, sustainable practices, and public awareness are equally essential. Strategies such as renewable energy adoption, waste reduction, green infrastructure, sustainable agriculture, and circular economy models offer viable pathways to mitigate pollution and foster long-term sustainability.

This study underscores the necessity for holistic, science-driven, and community-inclusive approaches to environmental pollution management. Integrating environmental monitoring, public health interventions, ecological restoration, and policy enforcement will be key to protecting human health, conserving ecosystems, and achieving sustainable development goals. Future research should focus on emerging pollutants, such as nanoplastics, endocrine-disrupting chemicals, and complex chemical mixtures, while evaluating the efficacy of mitigation strategies in varied socio-ecological contexts.

Ultimately, mitigating environmental pollution requires coordinated action across local, national, and global levels. A sustainable future depends on our ability to balance economic development with ecological stewardship, reduce pollutant emissions, and foster resilience in both human and natural systems.

5. REFERENCES

[1] Athapattu, B., Perera, H., & Wijesekara, R. (2021). Microplastic contamination in Sri Lankan coastal areas: Sources and implications. Marine Pollution Bulletin, 170, 112675. https://doi.org/10.1016/j.marpolbul.2021.112675

[2] Balakrishnan, K., Ghosh, S., Ganguli, B., Sambandam, S., Dey, S., Smith, K. R., & Bruce, N. (2019). The impact of air pollution on health in South Asia. Environmental Research, 180, 108817. https://doi.org/10.1016/j.envres.2019.108817

[3] Basner, M., Babisch, W., Davis, A., Brink, M., Clark, C., Janssen, S., & Stansfeld, S. (2014). Auditory and non-auditory effects of noise on health. The Lancet, 383(9925), 1325–1332. https://doi.org/10.1016/S0140-6736(13)61613-X

[4] Brauer, M., Freedman, G., Frostad, J., van Donkelaar, A., Martin, R., Dentener, F., ... & Cohen, A. (2016). Ambient air pollution exposure estimation for the Global Burden of Disease 2013. Environmental Science & Technology, 50(1), 79–88. https://doi.org/10.1021/acs.est.5b03709

[5] Cho, Y., Ryu, S. H., Lee, B. R., Kim, K., Lee, E., & Choi, J. (2015). Effects of artificial light at night on human

health: A literature review of observational and experimental studies applied to exposure assessment. Chronobiology International, 32(9), 1294–1310. https://doi.org/10.3109/07420528.2015.1073158

[6] Cohen, A. J., Brauer, M., Burnett, R., Anderson, H. R., Frostad, J., Estep, K., ... & Forouzanfar, M. H. (2017). Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: An analysis of data from the Global Burden of Diseases Study 2015. The Lancet, 389(10082), 1907–1918. https://doi.org/10.1016/S0140-6736(17)30505-6

[7] Diaz, R. J., & Rosenberg, R. (2008). Spreading dead zones and consequences for marine ecosystems. Science, 321(5891), 926–929. https://doi.org/10.1126/science.1156401

[8] Driscoll, C. T., Lawrence, G. B., Bulger, A. J., Butler, T. J., Cronan, C. S., Eagar, C., ... & Weathers, K. C. (2001). Acidic deposition in the northeastern United States: Sources and inputs, ecosystem effects, and management strategies. BioScience, 51(3), 180–198. https://doi.org/10.1641/0006-3568(2001)051[0180:ADITNU]2.0.CO;2

[9] FAO. (2020). The state of the world's land and water resources for food and agriculture – Systems at breaking point. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/ca8031en/CA8031EN.pdf

[10] Fernando, N., Jayasinghe, S., & Rathnayake, C. (2022). The X-Press Pearl disaster: Assessing marine plastic pollution in Sri Lanka. Marine Pollution Bulletin, 176, 113451. https://doi.org/10.1016/j.marpolbul.2022.113451

[11] Galloway, T. S., Cole, M., & Lewis, C. (2017). Interactions of microplastic debris throughout the marine ecosystem. Nature Ecology & Evolution, 1(5), 0116. https://doi.org/10.1038/s41559-017-0116

[12] Gaston, K. J., Davies, T. W., Bennie, J., & Hopkins, J. (2013). Reducing the ecological consequences of night-time light pollution: Options and developments. Journal of Applied Ecology, 50(6), 1256–1266. https://doi.org/10.1111/1365-2664.12114

[13] Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, use, and fate of all plastics ever made. Science Advances, 3(7), e1700782. https://doi.org/10.1126/sciadv.1700782

[14] Herath, S., Wickramasinghe, S., & Perera, B. (2021). Water pollution and human health impacts in Sri Lanka: A review. Environmental Monitoring and Assessment, 193, 582. https://doi.org/10.1007/s10661-021-09333-1

[15] IQAir. (2023). World Air Quality Report 2023. IQAir. https://www.iqair.com/world-air-quality-report

[16] Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., ... & Law, K. L. (2015). Plastic waste inputs from land into the ocean. Science, 347(6223), 768–771. https://doi.org/10.1126/science.1260352

[17] Jayasumana, C., Gunatilake, S., & Siribaddana, S. (2015). Glyphosate, hard water, and nephrotoxic metals: Are they the culprits behind the epidemic of chronic kidney disease of unknown etiology in Sri Lanka? International Journal of Environmental Research and Public Health, 12(12), 14385–14401. https://doi.org/10.3390/ijerph121214385

[18] Karunathilake, K., Kumara, K., & Rathnasiri, S. (2020). Urban air pollution and respiratory health in Colombo and Kandy, Sri Lanka. Environmental Monitoring and Assessment, 192, 112. https://doi.org/10.1007/s10661-020-8110-5

[19] Kelly, F. J., & Fussell, J. C. (2017). Air pollution and public health: Emerging hazards and improved understanding of risk. Environmental Geochemistry and Health, 39(4), 631–649. https://doi.org/10.1007/s10653-017-9925-1

[20] Khan, S., Shahnawaz, M., & Singh, R. (2019). Water pollution and human health in South Asia: A review. Environmental Monitoring and Assessment, 191, 327. https://doi.org/10.1007/s10661-019-7439-2

[21] Kumara, W., & Rathnasiri, S. (2020). Air pollution trends and health impacts in Sri Lankan urban centers. Sri Lanka Journal of Medicine, 29(1), 15–28.

[22] Lebreton, L. C. M., & Andrady, A. (2019). Future scenarios of global plastic waste generation and disposal. Palgrave Communications, 5, 6. https://doi.org/10.1057/s41599-018-0212-7

[23] Lelieveld, J., Evans, J. S., Fnais, M., Giannadaki, D., & Pozzer, A. (2019). The contribution of outdoor air pollution sources to premature mortality on a global scale. Nature, 525(7569), 367–371. https://doi.org/10.1038/nature15371

[24] Luo, C., He, Q., Liu, X., & Peng, X. (2012). Heavy metals in soil, crops, and human health: A review. Environmental Pollution, 163, 153–164. https://doi.org/10.1016/j.envpol.2011.12.008

[25] Mukherjee, S. (2015). Noise pollution in Indian cities: Health impacts and mitigation strategies. Journal of Environmental Research and Development, 9(4), 915–923.

[26] Obbard, R. W., Sadri, S., Wong, Y. Q., Khitun, A. A., Baker, I., & Thompson, R. C. (2014). Global warming releases microplastic legacy frozen in Arctic Sea ice. Earth's Future, 2(6), 315–320. https://doi.org/10.1002/2014EF000240

[27] Perera, M., & Karunarathna, H. (2020). Artificial light at night and ecological implications in Sri Lanka. Journal of Environmental Biology, 41(3), 502–510.

[28] Rahman, M. M., Rahman, M. M., & Islam, M. S. (2021). Water pollution and human health in South Asia: Risk factors and mitigation strategies. Environmental Challenges, 4, 100145. https://doi.org/10.1016/j.envc.2021.100145

[29] Sharma, S., Chatterjee, S., & Jain, R. (2020). Microplastics: Emerging threat to human and environmental health. Environmental Science and Pollution Research, 27, 27850–27861. https://doi.org/10.1007/s11356-020-09395-9

[30] Singh, B., Kaur, R., & Kumar, V. (2018). Soil contamination and its impact on agricultural productivity in South Asia: A review. Environmental Monitoring and Assessment, 190, 642. https://doi.org/10.1007/s10661-018-7027-5

[31] Tilman, D., Balzer, C., Hill, J., & Befort, B. L. (2011). Global food demand and the sustainable intensification of agriculture. Proceedings of the National Academy of Sciences, 108(50), 20260–20264. https://doi.org/10.1073/pnas.1116437108

[32] UN. (2015). Transforming our world: The 2030 agenda for sustainable development. United Nations. https://sdgs.un.org/2030agenda

[33] UNFCCC. (2015). Paris Agreement. United Nations Framework Convention on Climate Change. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[34] United Nations Environment Programme (UNEP). (2021). Global environmental outlook – GEO-6: Healthy planet, healthy people. https://www.unep.org/resources/global-environment-outlook-6

[35] UNICEF & WHO. (2019). Progress on household drinking water, sanitation and hygiene 2000–2017: Special focus on inequalities. UNICEF and World Health Organization. https://www.unicef.org/reports/progress-on-drinking-water-sanitation-and-hygiene-2019

[36] Weart, S. (2008). The discovery of global warming. Harvard University Press.

[37] Weerakoon, D. (2021). Community-based approaches for environmental management in Sri Lanka. Journal of Environmental Management, 285, 112150. https://doi.org/10.1016/j.jenvman.2021.112150

[38] Wright, S. L., & Kelly, F. J. (2017). Plastic and human health: A micro issue? Environmental Science & Technology, 51(12), 6634–6647. https://doi.org/10.1021/acs.est.7b00423