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## Urban Environmental Problems, Challenges, and Policy Frameworks in Ethiopia: A Systematic Review

### Review Article

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### ABSTRACT

This systematic review examines the critical urban environmental challenges and policy frameworks in Ethiopia, providing valuable insights for sustainable future development. The review consolidates existing literature to identify key environmental issues, their implications for human health, and the overarching policy landscape. Urbanization and demographic growth have intensified problems such as climate change, water pollution, land degradation, and deforestation, which threaten ecological stability and public health. Despite the existence of environmental policies since 1995, their effective implementation remains a significant challenge, largely hampered by limited financial resources, weak institutional capacity, and insufficient political commitment. This review aims to catalog the major urban environmental problems in Ethiopia, analyzing their impacts on ecosystems and communities. It also evaluates current policy structures to assess their effectiveness and identify gaps in implementation. Using a comprehensive methodology, the review drew from a wide range of sources, including academic databases like Scopus, ScienceDirect, ResearchGate, as well as official government and institutional reports. A total of 75 relevant articles and publications, selected through rigorous screening following PRISMA guidelines, form the basis of this analysis. The review emphasizes the importance of strengthening environmental governance, enhancing policy enforcement, and promoting community-based natural resource management to address these challenges effectively. Furthermore, it highlights the need for improved environmental impact assessments, sustainable land use practices, and increased stakeholder participation. Although significant strides have been made, persistent implementation gaps reveal the urgency for policy reforms and resource mobilization. The findings underscore the importance of coordinated efforts across government sectors and civil society to mitigate environmental problems, safeguard ecosystems, and protect public health. Ultimately, this review aims to inform policymakers, practitioners, and researchers to develop more effective strategies for sustainable urban development in Ethiopia, ensuring environmental resilience and improved quality of life for its citizens.

**Keywords:** urban environmental problems, policy framework, systematic review, land degradation, climate change



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## INTRODUCTION

Urbanization is rapidly advancing in developing nations and is expected to continue this trend in the foreseeable future (Zhang, 2016). Ethiopia, in particular, is experiencing one of the fastest urbanization rates in the world, as reported by the United Nations Department of Economic and Social Affairs (United Nations Department of Economic and Social Affairs, 2018). Urban population growth is not confined to Addis Ababa; other large cities and towns, such as Mekele in the north and Arba Minch in the south, are also experiencing rapid expansion. However, this growth is poorly regulated ([Ayele & Tarekegn, 2020](#)). Consequently, cities in the developing world have been significantly impacted by increased urbanization and population growth (Wei & Ewing, 2018).

Environmental issues are often neglected in less developed countries, with minimal attention paid to the pressing challenges. Recently, significant urban challenges have arisen, including climate change, freshwater scarcity, water contamination, deforestation, and land degradation, primarily driven by urban expansion and demographic shifts. These challenges are complex, and understanding their interactions is even more difficult (Uttara et al., 2012). The UNCCD defines land degradation as a global environmental issue characterized by a decline in the productivity of ecosystem goods and services provided by land, along with a decrease in both biological and economic productivity compared to baseline levels. This presents significant challenges to both ecological and human well-being (Nigussie, 2018). The impact of land degradation on the environment is often linked to deforestation (Berhanu, 2014). The population explosion, without corresponding economic growth, has resulted in serious environmental degradation. Observable issues include soil erosion, land degradation, biodiversity loss, and depletion of natural resources, all exacerbated by the global challenge of climate change ([Mesfin, 2010](#)).

On the other hand, the rise in urbanization has led to adverse environmental impacts and may contribute to health issues globally, particularly in developing nations (Zhao et al., 2022). Thus, urbanization is exacerbating urban problems more than anticipated. In countries like Ethiopia, the rapid growth of urban areas has resulted in numerous environmental challenges that affect both local and global ecosystems ([Anukwonke, 2015](#)). Additionally, issues within urban settings are closely tied to the intensity of human activities, including the types of activities and population density (Li et al., 2017). Urban communities impact their surroundings through their consumption of food, energy, and water, as well as through land transformation, leading to pollution and a decline in the quality of life for the large populations residing there (Javan et al., 2024). Consequently, these urban issues have worsened the quality of urban living, posing challenges to human health (Molla, 2015).

In Ethiopia, environmental issues are primarily driven by underdevelopment, with millions of people living below the minimum standard for a decent human existence. They lack sufficient clothing, food, education, shelter, sanitation, and healthcare (Yared, 2009). Urban areas face significant environmental challenges, including land degradation, climate change, deforestation, water pollution, and air pollution (César & Ekbom, 2013). Additional obstacles include toxic household waste, biodiversity loss, inadequate ecosystem services, urban outdoor air pollution—especially in cities like

Addis Ababa—and the spread of invasive alien species. The impact of these issues is detrimental to human health and poses a threat to a clean environment. It is essential for urban areas to have access to clean water, improved sanitation, and high-quality air, soil, and water (Bigio & Dahiya, 2024). The challenges of maintaining quality urban ecosystems are significant for both developed and developing countries, but the situation is particularly dire in less developed areas unless a unified and regulated approach to environmental issues is implemented.

In contrast, developed countries, which are more industrialized, generally provide satisfactory services. Cities in developing nations, such as Addis Ababa, struggle with worsening urban environments. The proliferation of informal settlements and severe slum conditions are clear indicators of environmental decline. Often, living standards in these slums fall below acceptable levels, compromising the quality of water, air, and soil (Tsutsumi & Bendewald, 2010). Slums typically lack adequate sanitation and water supply, sufficient living space, durable housing, and security of tenure (UN-Habitat, 2018). These various environmental challenges highlight a lack of effective policies to address the impacts of urban growth. Therefore, effective urban planning is crucial for tackling these issues.

According to the United Nations Environment Programme (UNEP) (UNEP, 2018), solid waste is another significant environmental challenge in urban areas, greatly affecting public health and the environment. The negative effects of solid waste extend beyond health issues, resulting in environmental and social consequences, with particularly severe economic repercussions in developing countries compared to developed ones (World Bank, 2018). In Ethiopia, the solid waste issue is exacerbated by rapid urbanization and industrial development in major cities (Gelan, 2021). These challenges pose serious threats to human health, the environment, and economic activities (Hailemariam & Ajeme, 2014), significantly affecting the quality of life in local communities. Environmental challenges in Ethiopia have notably impacted socio-economic dynamics, with renewable resources such as water, forests, and land deteriorating, leading to reduced productivity levels in the country's highland areas.

On the other hand, addressing the problems and challenges in the urban environment of the country requires effective policies and strategies to manage the growth of these critical issues, which are particularly severe in many developing countries. Environmental policies are generally formulated to regulate the relationship between humans and the physical environment, aiming to maximize mutual benefits for both. These policies primarily focus on challenges posed by human activities that negatively impact health and well-being, as well as opportunities for living in a clean and safe environment (Benson & Jordan, 2015). Different countries have established distinct environmental policy frameworks to address major issues, impacts, and contributors to environmental pollution.

In Ethiopia, the environmental political landscape emphasizes the adoption and implementation of environmental policies. Existing challenges and limitations serve as the foundation for policies aimed at solving the country's environmental issues. The principle driving policy implementation has benefited environmental policy initiatives (Kefauver, 2011). Consequently, the environmental problems

in Ethiopia are significant and require collaboration and consensus among stakeholders to achieve the goals of environmental policy in every project throughout all phases.

The country's policy framework has been in place since 1995; however, there have been challenges in the governmental implementation process for providing environmental conservation and protection. Environmental protection policies and programs have been established by the government at various levels, including zonal, federal, regional, and district levels, taking into account the indigenous knowledge of the community (Ethiopian Environmental Protection Authority, 2011). Environmental challenges continue to create difficulties, leading to policies being hindered by implementation issues (Mebrahtu, 2021) due to a lack of effective institutional frameworks addressing environmental concerns. On the other hand, Ethiopia has made significant progress in approving and developing an environmental policy framework; however, the implementation of conservation strategies has been challenged by existing gaps (Dejenie & Kakiso, 2023).

Thus, while Ethiopia has legal and policy frameworks designed to mitigate serious environmental problems and challenges, implementation remains problematic due to weak institutional development, ineffective planning, inadequate capacity of sectoral institutions, professional capacity needs, and financial constraints (Kenea, 2012). Additionally, many developing countries exhibit weak prioritization of environmental challenges and poor political commitment, all of which affect the implementation strategies of environmental policy frameworks.

This systematic review provides vital information related to urban environmental problems, challenges, and policy frameworks in Ethiopia. The research systematically reviews existing sources related to the country's environmental issues. Based on the findings of this systematic review, it will be helpful for the country to identify gaps and develop a better guide and effective strategies for a safer future and environment. First, this paper aims to identify and catalog various urban environmental problems in Ethiopia, along with their implications for human health and well-being. Second, the review seeks to outline the specific challenges confronting the Ethiopian environment and analyze their effects on ecological systems and human populations. Additionally, this work will evaluate the existing policy frameworks and their structural composition to determine their effectiveness in guiding environmental implementation strategies across Ethiopia.

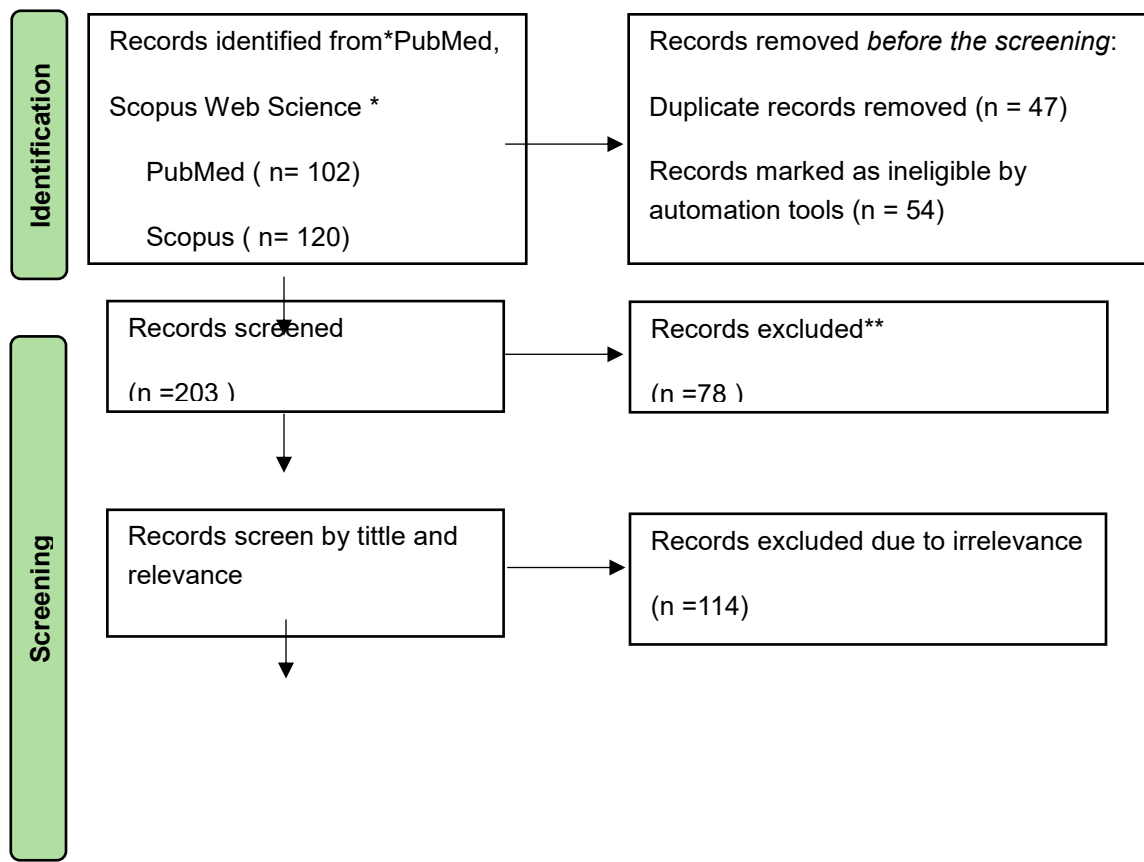
## **METHODS AND MATERIALS**

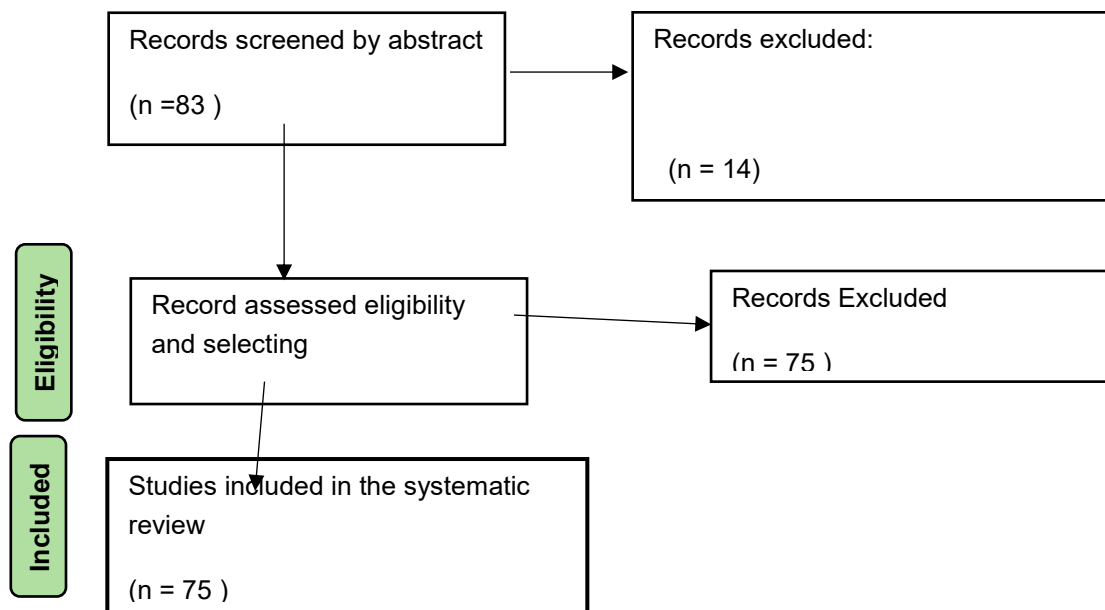
A comprehensive literature review was vital for thoroughly exploring the primary aim of this study, which centers on urban environmental problems and their implications for the community. This review addresses the challenges posed by environmental issues and their effects while examining the regulatory and policy frameworks necessary to mitigate these significant challenges. To gather detailed information, the systematic review utilized various sources, including the Scopus search engine, Elsevier, ResearchGate, ScienceDirect, the World Academy of Science, Cell Press, IISTE, Google Scholar, Web of Science, Springer, and pertinent institutional and academic publications. It also referenced numerous articles and governmental documents through its cited works.

All cited articles were organized using a citation management platform in accordance with the guidelines established by PRISMA and Barbara Kitchenham for standardized systematic reviews (PRISMA, 2020). To avoid biased results, the author cross-checked various articles to ensure reliability, facilitating the selection of the most relevant papers for an in-depth study of the issue. The author systematically registered and screened all articles to analyze their relevance and detail concerning environmental problems and practices.

Within the literature review, a selection of articles was examined in depth. Approximately 114 redundant articles were excluded for failing to provide significant information related to the environment, instead offering generalized content unsuitable for this systematic review. Ultimately, the study analyzed a total of 75 papers sourced from Scopus, Google Scholar, and reputable websites that regularly publish on environmental issues, providing comprehensive analyses (Refer to Figure 1). Various techniques were employed to eliminate biased information, ensuring a standardized quality for the review. This systematic review effectively examines environmental issues and their applications, leading to a better understanding of major urban environmental problems in the country and the implications of failing to address these challenges.

The review highlights the difficulties encountered and aims to clarify existing environmental policies and the gaps in their implementation. Despite the study's thorough nature, it reveals ongoing gaps in the execution of environmental policies and practices within the country. While some articles noted these implementation gaps, a detailed investigation is necessary to uncover why the environmental policies are not effectively addressing these issues, considering all stakeholders. This understanding is crucial, as the challenges presented have significant implications for both ecosystems and human health, underscoring the importance of addressing them.





**Figure 1: PRISMA flow diagram**

Figure 1: PRISMA flow diagram

## RESULTS

### Environmental Degradation in Urban Ethiopia: A Multifaceted Challenge

Different countries face unique urban environmental challenges, and no nation is free from these issues. Urban areas, in particular, encounter a variety of environmental problems. Ethiopia, known for its rich natural resources and biodiversity, heavily relies on these resources. However, rapid population growth and extensive resource use have led to significant environmental degradation (Kefauver, 2011). Ethiopia is grappling with severe urban challenges, including the proliferation of informal settlements and the worsening conditions of slums, which serve as clear indicators of a deteriorating urban environment. These slum areas often fall below acceptable living standards, with compromised water, air, and soil quality (Tsutsumi & Bendewald, 2010). Additional issues such as inadequate sanitation, overcrowded solid waste, housing shortages, and air pollution, all exacerbated by population growth and urban expansion, are particularly prominent in Addis Ababa. Beyond these urban challenges, Ethiopia faces numerous environmental issues, including soil erosion, declining fertility, deforestation, loss of biodiversity, and water quality deterioration (Bekele, 2008). Collectively, these factors pose significant challenges to the urban environment in the country. Moreover, the European Commission (2024) has identified additional environmental challenges, including climate change, outdoor air pollution, and household toxic waste. Social, economic, and political factors further complicate the situation, often exacerbating existing environmental degradation. The cycle of poverty compels individuals to prioritize immediate survival over long-term environmental sustainability, leading to further degradation instead of careful consideration (Avis, 2018).

Ethiopia also faces challenges such as famine, recurrent droughts, infrastructure issues, and political instability, all of which complicate environmental management (Ogbaharya & Tecele, 2012).



Furthermore, various industries contribute to environmental pollution by discharging waste substances, including textile, beverage, and tanning industries, all of which pose significant challenges to the environment and food processing sectors. The growth of urbanization in Ethiopia has been accompanied by an increase in motorization and economic development in urban areas. This has led to a rise in air pollution, which, along with other environmental issues, poses significant health risks and threatens the environment. A poor regulatory framework and a lack of clean fuel, particularly concerning vehicle emissions, present additional challenges. Various stakeholders, including the government and organizations, are striving to reduce air pollution (Tsutsumi & Bendewald, 2010). Efforts have been made to lower the sulfur content in fuels and to adopt cleaner vehicle technologies (United Nations Environment Programme [UNEP], 2010). Additionally, population growth has led to a higher demand for fuelwood and agricultural land, prompting significant encroachment into forested areas. This has resulted in deforestation at alarming rates (Biswas, 2022). Estimates indicate that approximately 1.24 million hectares of natural forest were cleared for agricultural expansion between 1990 and 2014 (Woody Biomass Inventory and Strategic Planning Project [WBISPP, 2004], Tajebe, 2017).

In Ethiopia, the average reforestation rate is 1 percent annually, which is higher than the Sub-Saharan African average of 0.6% (Kirui & Mirzabaev, 2014). Furthermore, without effective intervention to change traditional development patterns, it is estimated that an additional nine million hectares could be deforested between 2010 and 2030. During the same period, wood fuel consumption is projected to increase by 65 percent, further exacerbating the degradation of forests (Government of Ethiopia, 2012).

Deforestation poses serious environmental challenges, leading to degradation and threatening food security, community livelihoods, and sustainable development in the country (Winberg, 2011). Consequently, the government must pay close attention to these challenges, as urbanization continues to expand urban centers and demand more space. Various plans are being implemented in urban areas that may convert agricultural land to urban use, potentially leading to significant challenges in food security due to extensive land use changes. In Ethiopia, a significant percentage of the population relies heavily on traditional energy sources such as charcoal, firewood, and animal dung residue from crops. Traditional sources account for 94% of the country's energy demand, while modern sources—primarily electricity and petroleum—constitute only about 6% (Hilawe, 2010). Furthermore, biomass fuels are often burned using inefficient, smoky traditional stoves in poorly ventilated kitchens, leading to serious air pollution and health risks (World Health Organization, 2015). This situation presents significant challenges in urban environments and has resulted in high mortality rates, particularly among vulnerable groups such as children, women, and the elderly.

Ethiopia also faces major environmental challenges, including climate change and soil degradation. Climate change has led to increased temperature variability and altered rainfall patterns, which may worsen in the coming years. These changes can result in more frequent floods and droughts, negatively

impacting agricultural production and, consequently, the national economy and people's livelihoods (Coulibaly et al, 2020).

Other environmental issues include greenhouse gas emissions, soil degradation, and water pollution, all of which can adversely affect agricultural output and human health (Tajebe, 2017). Methane, a potent greenhouse gas, contributes to global warming with a warming potential approximately 20 times greater than that of carbon dioxide (Intergovernmental Panel on Climate Change, 2007). Additionally, nitrous oxide emissions from manure have a global warming potential 300 times that of carbon dioxide (Intergovernmental Panel on Climate Change, 2007). Climate change is expected to bring about increasingly severe weather impacts, further degrading the country's ecosystems and exacerbating issues related to food security and malnutrition (World Bank, 2012). Despite some improvements, Ethiopia continues to face numerous challenges in achieving Millennium Development Goal 7, which aims for better environmental sustainability (World Bank, 2012).

### **Environmental Policy and Challenges in Ethiopia: A Framework for Sustainable Development**

Ethiopia is recognized as one of the world's most significant biodiversity hotspots, yet it also faces considerable degradation (Forum for Environment, 2011; Conservation International, 2012; McKee, 2012). The country is grappling with numerous environmental challenges, including soil erosion, deforestation, biodiversity loss, declining soil fertility, and poor water quality (Bekele, 2008; Ethiopian Environmental Protection Authority, 1997). As highlighted in the 1997 Ethiopian Environmental Policy, these issues pose serious threats to citizens and undermine the natural resources that form the foundation of the economy. A large portion of the population relies on the environment as their primary source of income through various activities (Cheever et al., 2011; McKee, 2012). The Ethiopian Environmental Policy, endorsed in 1997, aimed to promote sustainable social and economic development to improve the health standards and quality of life for all Ethiopians (Federal Democratic Republic of Ethiopia, 1997). The Ethiopian Constitution (FDRE Constitution, 1995) explicitly states that "all individuals have the right to a healthy and clean environment." Furthermore, it emphasizes that the government must ensure that everyone in Ethiopia can live in such an environment. Several articles within Ethiopia's environmental policy address issues concerning urban ecological management, either explicitly or implicitly. Specifically, Articles 3(7) and 3(8) address matters related to human settlements, ecological health, and urban settings. These articles aim to tackle environmental challenges, such as managing industrial waste and pollutants that degrade ecological quality (Federal Democratic Republic of Ethiopia, 1997). Consequently, environmental policy plays a vital role in addressing and reducing environmental risks, making the effective execution of these policies imperative. On the whole, the legal and regulatory structures for safeguarding the environment are largely promising. Furthermore, Article 3(9) focuses on air pollution and climate change, emphasizing the need to combat elements that lead to air pollution, such as methane emissions from inadequately managed sources. However, practical implementation indicates that the Environmental Protection Authority and its partners in Ethiopia bear the responsibility for effective policy management (Melese, 2009).



Proclamation No. 299/2002 on Environmental Impact Assessment (EIA) mandates that project proponents conduct an EIA for projects with significant environmental and social implications. Applying EIA is critical for assessing potential environmental damage, making effective implementation vital. According to Articles 43(2) and 92(3), full consultation and public participation are required when planning and executing projects that significantly impact the environment. Additionally, Article 92(4) emphasizes that both the authorities and citizens share the responsibility of protecting the environment. Therefore, stakeholders must play a vital role in implementing environmental policies. In Ethiopia, the failure to integrate environmental considerations into growth objectives has drawn significant criticism regarding the country's past progress, as noted in recent environmental studies (Damtie & Kebede, 2022), (Feyisa, 2016), (Getu, 2013), (Aregawi, 2014). Integrating environmental considerations into current operations and initiatives is crucial, as is formulating policies that encourage sustainable development.

Ethiopia's plan for a sustainable and environmentally friendly transformation has been hindered by the absence of essential policy components. As a result, flaws in the policy framework, legal system, and implementation methods have started to weaken the nation's environmental regulations (Hadis, Tesfaye, Hailu, et al., 2019). Key obstacles to achieving environmental protection goals include a lack of institutional connections, ambiguity regarding authority, insufficient local offices, and inadequate institutional capacity. The main obstacle to the effectiveness of Ethiopia's current environmental laws is their enforcement (Kefauver, 2011). An Addis Ababa University professor noted, "Making laws in Ethiopia is not a problem; however, the issue is that policy is not implemented" (Forum for Environment, 2011). Contributing factors to the poor implementation of environmental policies include social, economic, and political challenges. Furthermore, inadequate public awareness and engagement, limited funding, weak institutions, and low political commitment have also hindered the effective execution of environmental initiatives (Molla, Ikporukpo, & Olatubara, 2019).

In general, the research highlights the significant impact of environmental issues on human life, demonstrating that these challenges not only threaten ecological balance but also severely affect the well-being and lifestyles of people worldwide. Environmental degradation appears in various forms, such as air and water pollution, land degradation, deforestation, and loss of biodiversity. These issues pose both direct and indirect risks to human health, economic stability, and social development. For instance, contaminated water sources can lead to waterborne diseases, while air pollution is associated with respiratory and cardiovascular illnesses. Moreover, environmental challenges can limit access to essential natural resources, negatively impacting agriculture, industry, and daily life. The degradation of natural environments also reduces the quality of life in both urban and rural areas, contributing to increased poverty, migration, and social unrest in many regions.

Urban environmental problems are particularly pressing for developing nations like Ethiopia. As these countries experience rapid urbanization, the strain on existing infrastructure and natural resources intensifies. The growing urban populations often exceed the capacity of local governments to provide adequate services, leading to numerous environmental concerns. If these issues are not addressed

swiftly and effectively, they could escalate into more severe crises. For example, inadequate water supply and poor water quality pose serious health risks. In many urban areas, water sources become contaminated due to improper waste disposal and industrial pollution, resulting in higher incidences of waterborne diseases such as cholera and dysentery. Additionally, the scarcity of clean water can impede daily activities and hinder economic development.

Soil fertility decline is another critical issue linked to urbanization and environmental neglect. Unsustainable farming practices, deforestation, and industrial activities deplete the soil's nutrients, reducing agricultural productivity. This situation threatens food security, exacerbating poverty and hunger among vulnerable populations. Deforestation, often driven by the demand for land, timber, and fuel, leads to biodiversity loss, disrupts ecosystems, and accelerates climate change. Forests act as significant carbon sinks, and their destruction contributes to global warming. The loss of biodiversity further jeopardizes ecosystem stability, affecting species diversity, ecological resilience, and the ability of ecosystems to provide essential services such as pollination, water filtration, and climate regulation.

Air pollution, primarily from vehicle emissions, industrial activities, and biomass burning, is a critical issue, particularly in rapidly growing urban areas. High levels of pollutants such as particulate matter (PM), nitrogen oxides (NO<sub>x</sub>), and sulfur dioxide (SO<sub>2</sub>) adversely affect respiratory health and contribute to climate change. Additionally, improperly managed household toxic waste contaminates soil and water resources. This waste, which includes plastics, batteries, chemicals, and electronic waste, necessitates effective waste management systems to mitigate environmental contamination and health risks.

The study reveals that Ethiopia, like many developing nations, suffers from a significant lack of political commitment and effective policy management regarding environmental issues. Although there is an acknowledgment of the need for sustainable environmental management, the political will to implement comprehensive and enforceable policies remains weak. This inadequacy often leads to ineffective legislative frameworks, poor enforcement of existing laws, and insufficient resource allocation for environmental protection initiatives. As a result, environmental problems persist and often worsen over time.

In addition to political shortcomings, limited financial resources pose a significant barrier to addressing environmental degradation. Developing countries frequently struggle to allocate adequate funding for environmental projects, conservation efforts, and infrastructure development. This financial constraint hampers the execution of essential programs such as afforestation, pollution control, waste management, and water resource management. Weak financial support often results in reliance on external aid or incomplete projects, undermining long-term sustainability goals.

Moreover, weak institutional frameworks and ineffective policy implementation exacerbate the environmental crisis. Many government agencies lack the capacity, expertise, and coordination necessary to manage environmental issues effectively. When policies are developed without proper implementation plans, monitoring mechanisms, or accountability measures, their impact is limited.

This disconnect between policy formulation and practical action leads to environmental initiatives that are often superficial or short-lived, failing to produce meaningful change.

The research underscores that addressing these complex environmental challenges requires a multifaceted approach involving political will, adequate funding, strong institutions, and community participation. It calls for increased awareness among policymakers, stakeholders, and the public regarding the importance of sustainable environmental management. Strengthening government agencies, fostering inter-sectoral coordination, and establishing effective legal frameworks are vital steps toward successful policy implementation.

Furthermore, engaging local communities and encouraging their participation in environmental conservation efforts are crucial for sustainable development. Local populations, often the most directly affected by environmental degradation, can play an essential role in conservation, resource management, and awareness-raising. Empowering communities through education, alternative livelihood programs, and participatory decision-making can lead to more sustainable outcomes.

## **DISCUSSION**

A comprehensive literature review was conducted to investigate urban environmental issues, challenges, and the policy framework in Ethiopia. This review focused on scholarly articles published up to 2024, as well as the operational policy and legislative framework from 1997 to 2024. A total of 76 papers meeting the selection criteria were included, sourced from Scopus, Web of Science, Google Scholar, and official websites.

The findings indicate that Ethiopia faces significant environmental challenges that affect public health, ecosystems, and the economy, thereby impacting the quality of life in various communities (Hailemariam & Ajeme, 2014). Key urban environmental issues identified include the rise of informal settlements and poor slum conditions, deteriorating water quality, air pollution, housing shortages due to population growth, sanitation difficulties, and inadequate water supply (UN-Habitat, 2024). Additionally, the country grapples with soil erosion, declining soil fertility, deforestation, loss of biodiversity, and water quality degradation (Bekele, 2008). Addressing these issues requires a robust policy framework for effective management.

However, there is a notable lack of policy implementation (Mebrahtu, 2021) and institutional challenges regarding environmental issues. Urban areas also confront further environmental challenges, such as climate change, outdoor air pollution, and household toxic waste (European Commission, 2024). The absence of strong policy measures and effective responses has led to environmental degradation, underscoring the need for focused policy attention. Moreover, social, economic, and political challenges exacerbate these environmental issues. The lack of guidelines and effective policy management perpetuates a cycle of poverty, while inadequate attention to long-term environmental strategies leads to further degradation. Consequently, environmental policies are often overlooked, as highlighted in a study by Ayalew (2013), which suggests that without strong policy considerations, the situation could deteriorate further if not properly addressed. A robust

environmental policy framework is essential for effectively prioritizing and managing serious environmental issues. Additionally, limited financial resources, weak institutional capacities, and insufficient political commitment present significant obstacles to mitigating environmental problems (Molla, Ikporukpo, and Olatubara, 2019).

In comparative analysis, the successful advancement of the industry can accelerate the country's sustainability goals related to industrialization. The overall environmental effects, both positive and negative, differ among nations due to variations in their specific contexts and the competitiveness of their development. In this regard, numerous prior studies suggest that countries should consider their unique circumstances to mitigate the adverse effects of industrial development and operations (Zeng, 2021). Evidence from nations with successful experiences, such as China, South Korea, Vietnam, and Mexico, emphasizes the importance of adopting a strategy framework tailored to each country. This framework should be developed through a comprehensive examination of both external and internal factors to enhance the positive impacts of industries on the economy, while also considering their environmental and social effects (Connelly, 2020).

Ethiopia faces a range of environmental challenges shaped by its geography, socio-economic conditions, and inconsistencies in governance. In the highland areas, intensive farming, reliance on fuelwood, and poor enforcement of land use regulations have led to widespread deforestation and soil erosion (Abera, 2023). Conversely, the northern regions have suffered from environmental degradation and deforestation, compounded by the failure of previously successful restoration initiatives (Gashaw et al., 2024). Urban centers like Addis Ababa grapple with industrial pollution and inadequate waste management, resulting in heavily contaminated rivers such as the Akaki, which are burdened by untreated waste and elevated levels of heavy metals and organic pollutants (Melaku et al., 2020). Meanwhile, water scarcity is becoming critical in the Rift Valley, where groundwater suffers from high salinity and fluoride levels, limiting its use for drinking and irrigation (Alemayehu & Ayenew, 2022). Additionally, mining activities present a regional dichotomy: large-scale operations raise significant environmental and health concerns due to chemical discharges, while small-scale mining in rural areas, despite its harmful effects, has the potential to become sustainable if properly formalized and regulated (Zelege et al., 2024). These diverse scenarios underscore the need for region-specific and multi-sectoral environmental governance that addresses local contexts, enhances institutional capacity, and fosters community engagement.

This systematic review highlights the urgent need for improved financing procedures to overcome budget constraints related to environmental management, facilitating better responses to environmental challenges and access to necessary funding. Strong political commitment and effective implementation strategies are essential for managing the rising hazards and pollutants, especially in urban areas. Urban environmental issues, challenges, and policy frameworks have emerged as significant global concerns, with each country formulating its own strategies to monitor key drivers of environmental degradation. This review of urban environmental challenges and policy frameworks in Ethiopia is vital as it identifies pressing environmental issues and emphasizes their severity. It

provides stakeholders, policymakers, and interest groups with a concise overview of these challenges, encouraging them to reassess existing policies and seek solutions to Ethiopia's current environmental dilemmas. This review assists policymakers in balancing economic development with environmental priorities, guiding the country toward sustainable progress. The insights from this study may be valuable to other nations facing similar challenges, particularly in the developing world. Moving forward, it is recommended that Ethiopia adopt sustainable growth strategies that address its environmental issues and policy frameworks. Concrete steps must be taken toward sustainable development, with careful attention given to the social, political, and economic factors that influence environmental sustainability.

## CONCLUSION

This systematic review examines urban environmental problems, challenges, and the policy framework in Ethiopia. It relies on a comprehensive range of sources to draw reliable conclusions. Although Ethiopia has established environmental policies and regulations to tackle these issues, challenges within the policy framework hinder effective implementation. Scholars in the country note that while lawmaking is not an issue, the primary concern lies in executing these policies. This review seeks to enhance understanding of the key challenges that must be addressed to operationalize existing legislation and policies for environmental protection. In Ethiopia, various obstacles impede implementation, including weak institutional connectivity, limited capacity, insufficient funding, and inadequate political commitment. These challenges prevent the country from achieving its environmental protection objectives. Therefore, a thorough review is necessary to tackle current environmental issues and evaluate policy implementation to identify gaps and areas for improvement. The review underscores the need for better financing mechanisms to overcome budget constraints related to environmental matters, which could help manage these challenges and secure essential funding. Additionally, strong political commitment is crucial for the environmental policy framework and implementation strategies to effectively control hazards and pollutants, particularly in urban areas. The systematic review identifies several environmental issues, such as toxic household waste, loss of biodiversity, degradation of ecosystem services, urban air pollution, inadequate water supply, poor sanitation, informal settlement growth, slum proliferation, electricity challenges, and urbanization-related issues. These problems exacerbate environmental degradation and negatively impact health and livelihoods on both local and global scales. The severity of these challenges varies by region, with urban centers like Addis Ababa facing particularly acute issues due to their size as the largest urban area in the country. The study concludes that pollution, soil degradation, greenhouse gas emissions, and climate change are significant challenges affecting agricultural production and food security. Climate change continues to influence weather patterns, temperature variability, and rainfall levels, further degrading the country's ecosystems.

In conclusion, the systematic review emphasizes the importance of addressing social, political, and economic factors to achieve sustainable environmental development. Neglecting these aspects could worsen the ongoing challenges in urban environments and the overall ecosystem of Ethiopia.

Furthermore, the researcher recommends that the government enhance land use planning and enforcement to more effectively address the challenges of rapid urban expansion, land degradation, and deforestation. This includes implementing national and local land use plans that clearly designate areas for agriculture, conservation, or industry. It is also crucial to improve policies regarding environmental impact assessments for development projects, promote sustainable land management practices, and advance community-driven natural resource management. The study advocates for adopting environmentally friendly approaches to balance economic development with environmental protection. Additionally, it stresses the importance of creating appropriate policy and legal frameworks to improve environmental quality, including the adoption of green manufacturing technologies and efficient use of renewable energy. By doing so, regulators can ensure compliance with environmental policies, laws, and standards. Overall, these policy recommendations aim to strengthen environmental policies, address existing challenges, and promote more sustainable development in the near future. For these policies to be truly effective, they must be well-executed, widely accepted, and involve active participation and practical application.

### **ETHICAL STATEMENT**

Ethical approval is not applicable to this manuscript.

### **Abbreviations and acronyms**

Not Applicable

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### **Contribution of authors**

Ahmed Jama Adam: Writing – review & editing, Writing – original draft, Resources, Data curation, Investigation, Methodology. Formal Analysis. Abenezer Wakuma Kitila: Supervision, writing-review & editing, Resources, Conceptualization, Data curation, Formal analysis.

### **Data availability statement**

The data that support the findings of this study are available on request from the corresponding author.

### **Declaration of the use of AI**

The authors declare that no AI-assisted technologies, except reference formatting and language, were used during any stage in the preparation of this article.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.



## REFERENCES

- Anukwonke, C. C. (2015). Urbanization processes and the environment. Department of Environmental Management, Anambra State University, Uli, Nigeria. [https://www.academia.edu/11535045/URBANIZATION\\_PROCESSES\\_AND\\_ENVIRONMENT#site](https://www.academia.edu/11535045/URBANIZATION_PROCESSES_AND_ENVIRONMENT#site)
- Aregawi, T. (2014). Peculiar health problems due to industrial wastes in Addis Ababa city: The case of Akaki Kaliti industrial zone (Master's thesis). Addis Ababa University. [https://www.cell.com/heliyon/fulltext/S2405-8440\(20\)31468-7](https://www.cell.com/heliyon/fulltext/S2405-8440(20)31468-7)
- Aregawi, T. (2014). Peculiar health problems due to industrial wastes in Addis Ababa city: The case of Akaki Kaliti industrial zone (Unpublished master's thesis). Addis Ababa University. <https://www.omicsonline.org/open-access/contamination-of-rivers-and-water-reservoirs-in-and-around-addisababa-city-and-actions-to-combat-it.php?aid=88578&view=mobile>
- Avis, W. R. (2018). Inclusive green growth in developing countries (K4D Helpdesk Report). Institute of Development Studies. <https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/13999>
- Ayalew, G. (2013). An assessment of performance appraisal practices in the Ministry of Finance and Economic Development (Master's thesis). Addis Ababa University. URL needed for full APA citation.
- Ayele, A., & Tarekegn, K. (2020). The impact of urbanization expansion on agricultural land in Ethiopia: A review. *Environmental & Socio-Economic Studies*, 8, 73–80. <https://doi.org/10.2478/environ-2020-0020>
- Bekele, M. (2008). Ethiopia's environmental policies, strategies, and programs. In *Digest of Ethiopia's national policies, strategies & programs* (pp. 337–370). Forum for Social Studies. [https://books.google.com/books?hl=en&lr=&id=ndHwrVW6PwwC&oi=fnd&pg=PA337&dq=%5B50%5D.++%09Bekele,+M.\(2008\).+%E2%80%9CEthiopia%27s+Environmental+policies,+strategies+and+programs%E2%80%9D.+Digest+of+Ethiopia%27s+National+policies,+strategies+%26+programs](https://books.google.com/books?hl=en&lr=&id=ndHwrVW6PwwC&oi=fnd&pg=PA337&dq=%5B50%5D.++%09Bekele,+M.(2008).+%E2%80%9CEthiopia%27s+Environmental+policies,+strategies+and+programs%E2%80%9D.+Digest+of+Ethiopia%27s+National+policies,+strategies+%26+programs)
- Benson, D., & Jordan, A. (2015). Environmental policy: Protection and regulation. In J. D. Wright (Ed.), *International encyclopedia of the social & behavioral sciences* (2nd ed.). Elsevier.
- Bigio, G., & Dahiya, B. (2024). Urban environment and infrastructure: Towards livable cities. The World Bank. [https://books.google.com/books?hl=en&lr=&id=G9rn9NVAg6MC&oi=fnd&pg=PR7&dq=%5B12%5D.++%09Bigio,+G.+and+Dahiya,+B.\(2024\).+%E2%80%9CUrban+Environment+and+Infrastructure,+toward+s+Livable+Cities,%E2%80%9D+The+World+Bank,+USA&ots=bg\\_bHW7yxZ&sig=Qg2xcwMEP6vKw6WnNFfRFPcgC-k](https://books.google.com/books?hl=en&lr=&id=G9rn9NVAg6MC&oi=fnd&pg=PR7&dq=%5B12%5D.++%09Bigio,+G.+and+Dahiya,+B.(2024).+%E2%80%9CUrban+Environment+and+Infrastructure,+toward+s+Livable+Cities,%E2%80%9D+The+World+Bank,+USA&ots=bg_bHW7yxZ&sig=Qg2xcwMEP6vKw6WnNFfRFPcgC-k)
- Biswas, B. (2022). Deep learning-based multimodal fusion of Sentinel-1 and Sentinel-2 data for mapping deforested areas in the Amazon rainforest (Master's thesis). University of Twente. <http://essay.utwente.nl/90961/>
- César, E., & Ekbo, A. (2013). Ethiopia environmental and climate change policy brief. Sida's Helpdesk for Environment and Climate Change, 1–32. <https://sidaenvironmenthelpdesk.se/wordpress3/wp-content/uploads/2013/04/Ethiopia-Environmental-Climate-Change-Policy-Brief-Final-2013.pdf>
- Cheever, M., Graichen, K., Homeier, D., Howell, J., Kefauver, O., & Kimball, T. (2011). Environmental policy review: Key issues in Ethiopia 2011. Colby College Environmental Policy Group. [https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011\\_color\\_small.pdf](https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011_color_small.pdf)
- Conservation International. (2012). Biodiversity hotspots: Horn of Africa. [https://www.cepf.net/sites/default/files/eastern\\_afromontane\\_ecosystem\\_profile\\_final.pdf](https://www.cepf.net/sites/default/files/eastern_afromontane_ecosystem_profile_final.pdf)
- Coulibaly, T., Islam, M., & Managi, S. (2020). The impacts of climate change and natural disasters on agriculture in African countries. *Economics of Disasters and Climate Change*, 4(2), 347–364. <https://doi.org/10.1007/s41885-020-00064-2>
- Damtie, M., & Kebede, S. (2022). The need for redesigning and redefining institutional roles for environmental governance in Ethiopia. In *Movement for Ecological Learning Community Action*. [https://www.researchgate.net/publication/363619449\\_Effectiveness\\_of\\_Urban\\_Climate\\_Change\\_Governance\\_in\\_Addis\\_Ababa\\_City\\_Ethiopia](https://www.researchgate.net/publication/363619449_Effectiveness_of_Urban_Climate_Change_Governance_in_Addis_Ababa_City_Ethiopia)
- Dejenie, T., & Kakiso, T. (2023). Development and environmental policies of Ethiopia: Policy review from the viewpoint of development-environment sustainability linkage. *Heliyon*, 9(6), 17159. <https://doi.org/10.1016/j.heliyon.2023.e17159>
- Douglass, T. J. (1999). Performance implication of incorporating natural environmental issues into the strategic planning process: An empirical assessment. *Journal of Management Studies*, 35(2), 241–262. <https://doi.org/10.1111/1467-6486.00092>

- Ethiopian Environmental Protection Authority. (1997). Environmental policy of Ethiopia. <https://defendtheenvironment.org/wp-content/uploads/2024/02/1.-Environmental-Policy-of-Ethiopia-1997.pdf>
- Ethiopian Environmental Protection Authority. (2011). The Federal Democratic Republic of Ethiopia: Environmental protection authority portfolio identification document. <https://www.academia.edu/download/100666406/Mebrahtu.pdf>
- European Commission. (2024). Ethiopia country environmental profile. European Commission.
- Federal Democratic Republic of Ethiopia. (1997). Environmental policy of Ethiopia. <https://www.informea.org/sites/default/files/imported-documents/UNEP-CHW-NATLEG-NOTIF-Ethiopia01-LAW.English.pdf>
- Federal Democratic Republic of Ethiopia. (1997). Environmental policy of Ethiopia. [https://plasticsdb.surrey.ac.uk/documents/Ethiopia/Republic%20of%20Ethiopia%20\(1997\)%20Environmental%20Policy%20of%20Ethiopia.pdf](https://plasticsdb.surrey.ac.uk/documents/Ethiopia/Republic%20of%20Ethiopia%20(1997)%20Environmental%20Policy%20of%20Ethiopia.pdf)
- Feyisa, A. (2016). Environmental impact assessment in Ethiopia: A general review of history, transformation, and challenges hindering full implementation. Ambo University, Department of Natural Resources Management. [https://www.researchgate.net/profile/Adugna-Feyissa/publication/333566541\\_Environmental\\_Impact\\_Assessment\\_in\\_Ethiopia\\_A\\_General\\_Review\\_of\\_History\\_Transformation\\_and\\_Challenges\\_Hindering\\_Full\\_Implementation/links/5cf4f75992851c4dd0243077/Environmental-Impact-Assessment-in-Ethiopia-A-General-Review-of-History-Transformation-and-Challenges-Hindering-Full-Implementation.pdf](https://www.researchgate.net/profile/Adugna-Feyissa/publication/333566541_Environmental_Impact_Assessment_in_Ethiopia_A_General_Review_of_History_Transformation_and_Challenges_Hindering_Full_Implementation/links/5cf4f75992851c4dd0243077/Environmental-Impact-Assessment-in-Ethiopia-A-General-Review-of-History-Transformation-and-Challenges-Hindering-Full-Implementation.pdf)
- Forum for Environment (FFE). (2011). Ethiopian environment review. [https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011\\_color\\_small.pdf#page=17](https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011_color_small.pdf#page=17)
- Gelan, E. (2021). Municipal solid waste management practices for achieving green architecture concepts in Addis Ababa, Ethiopia. *Technologies*, 9(3), 48. <https://doi.org/10.3390/technologies9030048>
- Getu, M. (2013). Defiance of environmental governance: Environmental impact assessment in Ethiopia. [https://e3journals.org/cms/articles/1376567319\\_Getu.pdf](https://e3journals.org/cms/articles/1376567319_Getu.pdf)
- Government of Ethiopia. (2012). Addis Ababa. <https://www.sidalc.net/search/Record/dig-okr-109869549/>
- Hadis, S., Tesfaye, M., Hailu, S., & al. (2019). The politics of environment in Ethiopia: The policies and practices appraisal since 1991. *Advances in Science, Technology and Humanities*, 5(4), 88–97. <https://article.sciencepublishinggroup.com/pdf/ash.20190504.11>
- Hailemariam, M., & Ajeme, A. (2014). Solid waste management in Adama, Ethiopia: Aspects and challenges. *Integrated Development for Water Supply and Sanitation*, 8, 670–676. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=076f9916a05a0580af146669f770cfd1ac0b3fdc>
- Hilawe, L. (2010). Ethiopian energy sector review: For up to 2008. *Ethiopian Environment Review*. [https://www.academia.edu/download/30908541/Ethiopian\\_Environment\\_Review.pdf#page=100](https://www.academia.edu/download/30908541/Ethiopian_Environment_Review.pdf#page=100)
- Inter-Governmental Panel on Climate Change. (2007). Review on the impact of climate change on crop production (Sirinka Agricultural Research Center). <https://core.ac.uk/download/pdf/234661499.pdf>
- Islam, J., Ferdous, L., & Begum, A. (2014). Environmental policies and issues to ensure a safe environment. *International Journal of Innovative Research in Engineering & Science*, 10(3). <https://www.researchgate.net/publication/267210491>
- Javan, K., Altaee, A., BaniHashemi, S., Darestani, M., Zhou, J., & Pignatta, G. (2024). A review of interconnected challenges in the water–energy–food nexus: Urban pollution perspective towards sustainable development. *Science of the Total Environment*, 912, 169319. <https://doi.org/10.1016/j.scitotenv.2023.169319>
- Kefauver, O. (2011). Environmental policy review 2011: How environmental policy facilitates or constrains the activities of environmental NGOs in Ethiopia. *Environmental Policy Review: Key Issues in Ethiopia*, 2011(5). [https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011\\_color\\_small.pdf#page=17](https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011_color_small.pdf#page=17)
- Kenea, K. W. (2012). Ethiopian environmental policy: Challenges and prospects on sustainable social and economic development. LAP LAMBERT Academic Publishing. <http://repository.smuc.edu.et/bitstream/123456789/82/1/KelbesaWakumaKenea.pdf>
- Kirui, O. K., & Mirzabaev, A. (2014). Economics of land degradation in Eastern Africa (No. 128). ZEF Working Paper Series. <https://www.econstor.eu/handle/10419/99988>

- Li, J., Zhang, Y., Qin, Q., & Yan, Y. (2017). Investigating the impact of human activity on land use/cover change in China's Lijiang River Basin from the perspective of flow and type of population. *Sustainability*, 9(3), 383. <https://doi.org/10.3390/su9030383>
- McKee, J. (2012). Ethiopia: Country environmental profile. European Commission Delegation. [https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011\\_color\\_small.pdf](https://web.colby.edu/eastafricaupdate/files/2012/01/Environmental-Policy-Review-2011_color_small.pdf)
- Mebrahtu, K. H. (2021). Environmental policy of Ethiopia: Implementation and challenges. *International Journal of Political Science and Development*, 9(4). <https://www.academia.edu/download/100666406/Mebrahtu.pdf>
- Melese, E. (2009). Non-financial reporting: Corporate social responsibility and environmental reporting, an Ethiopian case. Retrieved from [https://www.connecting-africa.net/query\\_2.php?rid=B00087085](https://www.connecting-africa.net/query_2.php?rid=B00087085)
- Mesfin, D. (2010). Environmental Protection Authority of the Federal Democratic Republic of Ethiopia (EPA). Environmental Protection Authority establishment proclamation (No. 1997). [https://link.springer.com/chapter/10.1007/978-3-030-46523-0\\_11](https://link.springer.com/chapter/10.1007/978-3-030-46523-0_11)
- Molla, M. B. (2015). Urbanization process in developing countries: A review on urban ecosystem degradation and public health effect. *Research Journal of Agriculture and Environmental Management*, 4(4), 291–298. [https://www.researchgate.net/publication/310648741\\_Urbanization\\_process\\_in\\_developing\\_countries\\_A\\_review\\_on\\_urban\\_ecosystem\\_degradation\\_and\\_public\\_health\\_effect](https://www.researchgate.net/publication/310648741_Urbanization_process_in_developing_countries_A_review_on_urban_ecosystem_degradation_and_public_health_effect)
- Molla, M. B., Ikporukpo, C. O., & Olatubara, C. O. (2019). Evaluating policy and legal frameworks of urban green infrastructure development in Ethiopia. *Journal of Environmental Assessment Policy and Management*, 21(3), 1950016. <https://doi.org/10.1142/S1464333219500169>
- Ogbaharya, D., & Tecele, A. (2010). Community-based natural resources management in Eritrea and Ethiopia: Toward a comparative institutional analysis. *Journal of Eastern African Studies*, 4(3), 490–509.
- Tsutsumi, J., & Bendewald, M. J. (2010). Urban environmental challenges in developing cities: The case of Ethiopian capital Addis Ababa. *International Journal of Environmental and Ecological Engineering*, 4(6), 164–169. <https://doi.org/10.5395/ijee.2010.4.6.164>
- UN-Habitat. (2024). The challenge of slum: Global report on human settlements. United Nations Human Settlements Programme. <https://unhabitat.org/the-challenge-of-slums-global-report-on-human-settlements-2003>
- United Nations Department of Economic and Social Affairs. (2018). World urbanization prospects: Revision, highlights. <https://population.un.org/wup/Publications/Files/WUP2018-Highlights.pdf>
- United Nations Environment Programme. (2010). Addis Ababa highlights. UNEP Highlights, 5(8), 1-8. <https://www.unep.org/regions/africa/our-work-africa/un-environment-ethiopia>
- United Nations Environment Programme. (2018). Africa waste management outlook: Summary for decision-makers. <https://wedocs.unep.org/handle/20.500.11822/25515>
- Uttara, S., Nishi Bhuvandas, & V., Aggarwal. (2012). Impacts of urbanization on environment. *International Journal of Research in Engineering and Applied Sciences*, 2(2), 1637–1645. <https://doi.org/10.1234/ijreas.2012.5678>
- Wan, Y., Dong, S., Mao, Q., & others. (2013). Causes of environmental pollution after industrial restructuring in Gansu Province. *Journal of Resources and Ecology*, 4(1), 88–92. <https://bioone.org/journals/Journal-of-Resources-and-Ecology/volume-4/issue-1/j.issn.1674-764x.2013.01.012/Causes-of-Environmental-Pollution-After-Industrial-Restructuring-in-Gansu-Province/10.5814/j.issn.1674-764x.2013.01.012.short>
- Wei, Y., & Ewing, R. (2018). Urban expansion, sprawl, and inequality. *Landscape and Urban Planning*, 177, 259–265. <https://doi.org/10.1016/j.landurbplan.2018.05.002>
- Winberg, E. (2011). Participatory forest management in Ethiopia: Practices and experiences. Food and Agriculture Organization of the United Nations. [http://vcsewiki.czp.cuni.cz/w/images/9/99/Participatory\\_Forest\\_Management\\_in\\_Ethiopia\\_FAO\\_report.pdf](http://vcsewiki.czp.cuni.cz/w/images/9/99/Participatory_Forest_Management_in_Ethiopia_FAO_report.pdf)
- Woody Biomass Inventory and Strategic Planning Project. (2004). A national strategic plan for the biomass energy sector. Addis Ababa. <https://www.un-redd.org/sites/default/files/2021-10/ETHIOPIAN%20FOREST%20RESOURCES-%20%20CURRENT%20STATUS%20AND%20FUTURE%20MANAGEMENT%20OPTIONS%20%20IN%20VIEW%20OF%20ACCESS%20TO%20CARBON%20FINANCES%20.pdf>
- World Bank. (2012). Climate change impacts on global food security in Ethiopia. <https://www.science.org/doi/abs/10.1126/science.1239402>

- World Bank. (2012). Country partnership strategy for the Federal Democratic Republic of Ethiopia. <https://webapps.ifad.org/members/ec/123/docs/EC-2023-123-W-P-2.pdf>
- World Bank. (2018). What a waste 2.0: A global snapshot of solid waste management to 2050. <https://openknowledge.worldbank.org/handle/10986/30317>
- World Health Organization. (2015). World health statistics. <https://www.who.int/docs/default-source/gho-documents/world-health-statistic-reports/whostat2015.pdf>
- Yared, B. (2009). Environmental problems and solutions in Ethiopia generally and in Africa specifically: A case study on Ethiopia. [https://www.academia.edu/41396449/Essay\\_on\\_Sustainable\\_Development\\_of\\_Ethiopia\\_in\\_Relation\\_to\\_Environmental\\_Policy](https://www.academia.edu/41396449/Essay_on_Sustainable_Development_of_Ethiopia_in_Relation_to_Environmental_Policy)
- Zeng, D. Z. (2021). The past, present, and future of special economic zones and their impact. *Journal of International Economic Law*, 24(2), 259–
- Zhao, S. Q., Da, L. J., Tang, Z. Y., Fang, H. J., Song, K., & Fang, J. Y. (2006). Ecological consequences of rapid urban expansion: Shanghai, China. *Frontiers in Ecology and the Environment*, 4(7), 341–346. [https://doi.org/10.1890/1540-9295\(2006\)004\[0341:ECORUE\]2.0.CO;2](https://doi.org/10.1890/1540-9295(2006)004[0341:ECORUE]2.0.CO;2)
- Zhao, W., Chang, M., Yu, L., & Sohail, M. T. (2022). Health and human wellbeing in China: Do environmental issues and social change matter? *Frontiers in Psychology*, 13, 860321. <https://doi.org/10.3389/fpsyg.2022.860321>