Country report for Kenya[1]

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Abstract

This chapter examines soil conservation in Kenya, focusing on the legal and institutional challenges that hinder its effectiveness. It highlights key issues such as weak law enforcement, fragmented policies, and the insufficient prioritisation of soil conservation within development planning. The chapter explores how these challenges exacerbate soil degradation, particularly considering Kenya's growing population, rapid urbanisation, and industrialisation, and the subsequent impact on sectors such as food security and ecosystem health.

An analysis of the existing legal framework reveals significant shortcomings, including the lack of a dedicated soil protection law. Specific attention is given to existing laws, such as the Environmental Management and Coordination Act (EMCA) and the Fertilisers and Animal Foodstuffs Act, but the chapter emphasises that soil conservation remains overshadowed by other environmental priorities. The complexities of Kenya's land tenure system and institutional governance, with overlapping responsibilities between national and county governments, further complicate soil management.

The chapter also presents key findings, including the need for stronger institutional coordination, enhanced public awareness, and a more integrated approach to soil conservation. It offers recommendations aimed at improving legal frameworks, fostering inter-institutional collaboration, and developing region-specific soil management laws. It concludes by emphasising the urgent need for a dedicated soil protection law, particularly considering Kenya's ambitions in the green economy and the critical role of soil in mitigating climate change.

1 This chapter is an update of the one authored by Kameri-Mbote, Kamunge & Yatich (see Reference List).

Chapter contents

Summary

This chapter explores the state of soil conservation in Kenya, highlighting its secondary importance compared to broader land and environmental protection concerns. Despite the existence of various laws related to soil conservation, their effectiveness is severely undermined by weak institutions, poor implementation, and corruption. These challenges have allowed soil degradation to persist and worsen, especially as Kenya's growing population, rapid urbanisation, and industrialisation exert increasing pressure on land and soil resources. While legal frameworks exist, they have not evolved sufficiently to address the compounded challenges facing soil conservation. Agricultural production often takes precedence over soil protection, leading to a lack of comprehensive strategies for soil conservation.

One of the most significant gaps in Kenya's legal framework is the absence of a dedicated soil protection law. The chapter highlights that while numerous laws and policies address aspects of soil conservation, they are fragmented, overlapping, and occasionally in conflict, leading to inefficiency and confusion in their implementation. Although laws such as the Environmental Management and Coordination Act (EMCA, 1999), the Fertilisers and Animal Foodstuffs Act, and the Irrigation Act regulate environmental and soil-related activities, there is no cohesive law specifically focused on soil conservation. As a result, soil conservation is treated as an incidental element of broader environmental management, rather than as a critical component of Kenya's sustainable development strategies.

The chapter also reflects on the lessons learned from Kenya's constitutional and legal framework. The Constitution of Kenya guarantees the right to a clean and healthy environment, which includes soil protection. This right is linked to other fundamental rights, such as the right to adequate food, freedom from hunger, and the highest attainable standard of health. The judiciary has shown a progressive approach, particularly after the 2010 constitutional reforms, by emphasising the interconnectedness of environmental and socio-economic rights. Several court cases have held entities accountable for environmental harm, demonstrating the judiciary's commitment to interpreting environmental protection broadly. However, despite this judicial progress, soil conservation remains a peripheral concern within Kenya's overall environmental governance structure. Although laws such as the EMCA have been effective in addressing air, water, and biodiversity issues, soil conservation has not received the same level of attention or protection.

A key challenge identified in the chapter is Kenya's fragmented approach to environmental governance, where laws are often sector-specific and fail to address the interconnections between various environmental components such as soil, water, and air. This compartmentalised legal structure has resulted in poor coordination between national and county governments, hindering effective soil protection. Moreover, although environmental impact assessments (EIAs) are required for development

projects, their enforcement is weak, and irregularities in issuing EIA licences contribute to further environmental degradation.

Urbanisation is another major factor driving soil degradation in Kenya. The chapter focuses on counties including Kitui, Machakos, and Makueni, where urban sprawl and industrialisation, combined with fragile sandy soils and low rainfall, make these areas particularly vulnerable to soil erosion and degradation. Soil degradation disproportionately affects rural communities reliant on agriculture for their livelihoods, contributing to food insecurity and poverty. Despite Kenya's aspirations to lead in the green economy and climate change mitigation, soil conservation efforts have not been as robust as other environmental initiatives, especially given the critical role soil plays in carbon sequestration and mitigating climate change.

The chapter argues that addressing soil conservation in Kenya requires a multifaceted approach that integrates technical, economic, and political considerations. Political will is essential for successful legislative and policy reforms, as political dynamics often influence the adoption of such reforms. The chapter stresses the importance of recognising the political economy of soil governance, highlighting that treating legislative changes purely as technical processes is likely to fail without addressing the broader political context and the incentives of various stakeholders. The chapter calls for improved institutional collaboration, prioritisation of public awareness, and enhanced access to information to strengthen soil conservation efforts.

The chapter presents several recommendations for improving soil conservation and protection in Kenya. These include the development of a comprehensive national soil policy involving all stakeholders, the participatory creation of soil legislation, and the establishment of region-specific soil management laws at the county level. These laws should be tailored to the unique characteristics of local soils and promote coordinated efforts between national and county governments. The chapter advocates for a move away from fragmented, sectoral approaches to environmental law enforcement and calls for greater collaboration between institutions such as the National Environment Management Authority (NEMA) to implement soil protection laws effectively.

The chapter also recommends integrating soil conservation education into school curricula to foster awareness among younger generations and cultivate future environmental stewards. Access to updated, specific soil quality information is essential, particularly for small-scale farmers who rely heavily on soil for their livelihoods. Soil protection techniques including afforestation, reforestation, and the promotion of low-cost soil conservation technologies should be actively encouraged. In addition, incentives such as subsidies for fertilisers and manure should be provided to improve soil fertility.

A holistic legislative approach to soil conservation is necessary, one that addresses the many factors contributing to soil degradation, such as erosion, contamination, acidification, salinisation, and nutrient loss. The chapter also suggests that soil conservation efforts should extend beyond national borders, recognising the transboundary

nature of soil-related issues. The proposed legislation should incorporate gender-sensitive provisions, acknowledging the vital role of women in soil and land management and their heightened vulnerability to soil degradation.

The chapter advocates for the establishment of a national soil authority to oversee soil information, planning, evaluation, and monitoring. This authority would work alongside devolved expert advisory bodies to guide legal, strategic, and policy decisions. Furthermore, the proposed soil law should facilitate public participation, capacity building, and research, particularly in erosion-prone areas. A guaranteed financing scheme should also be set up to support the resource-intensive nature of soil conservation efforts, ensuring their long-term sustainability. The law must provide clear mechanisms for accountability, offering dispute resolution through the National Environment Tribunal and the Environment and Land Court.

In conclusion, the chapter calls for the creation of a soil-specific law that provides a comprehensive, integrated approach to soil conservation. This law should prioritise public participation, address transboundary issues, and enforce accountability. Such legislation would not only protect Kenya's soils but also promote sustainability, equity, and long-term environmental health.

1 Introduction and country information

Kenya, a former British colony, attained self-rule in June 1963 and full independence on 12 December 1963. Situated along the Equator, it lies between latitudes 4°N and 4°S and longitudes 33°83'E and 41°75.5'E.[2] The country shares borders with Uganda to the west, Tanzania to the south, Ethiopia to the north, South Sudan to the northwest, Somalia to the east, and the Indian Ocean to the southeast. Kenya spans approximately 582,646 km², 11,230 km² (1.9%) of which is water. Notably, 84% of its landmass (490,000 km²) comprises arid and semi-arid areas characterised by low rainfall, high evapotranspiration, poor soil fertility, and limited water resources.

Kenya's geography can be divided into four distinct regions: the coastal plain, the arid low plateau, the highlands, and the Lake Victoria basin, each with unique land use patterns and rainfall levels. The Lake Victoria basin receives the heaviest and most consistent rainfall.[3]

Historically, Kenya has been the leading economy in East Africa, excelling in GDP, poverty alleviation, literacy, healthcare, infrastructure, and industry. However, its dominance is now being challenged by neighbours such as Rwanda and Ethiopia. Internal issues, including corruption and high taxation, have raised the cost of doing business and deterred investment. To maintain its regional influence, Kenya must

2 Government of Kenya (2016b: 21).
3 Ibid.: 25-26.

address these challenges, repurpose infrastructure projects, and deepen regional integration.

Kenya is also a regional leader in integration, hosting refugees from neighbouring countries and playing a key role in peace processes for Sudan and Somalia. However, refugee camps in arid areas have worsened land degradation in those regions.

The country faces significant security threats, particularly from al-Shabaab, a militant group based in Somalia. Al-Shabaab recruits primarily from Kenya's marginalised borderlands, which have long suffered neglect. While terror attacks have spread across the country, coastal counties including Kwale have been proactive in countering violent extremism. Initiatives in these regions aim to promote sustainable development and mitigate the insecurity and displacement caused by terrorism, with a focus on bolstering agriculture and coordinating multi-stakeholder efforts.

Soil has ecological, cultural, economic, and political dimensions.[4] It supports diverse ecosystems, provides habitats for living creatures, and sustains livelihoods.[5] Despite its critical role, Kenya lacks specific legislation dedicated to soil management. Soil protection principles are scattered across various laws and policies addressing land rights, environmental protection, natural resources, and public health.

For example, measures such as bench terraces protect soil from erosion, while public health laws address soil contamination by vermin. However, soil is rarely the primary focus, leading to fragmented management that struggles to balance competing interests. This highlights the need for dedicated soil policies, sound governance, and effective monitoring to ensure sustainable soil use for future generations.

This chapter examines Kenya's laws, policies, and programs on soil protection to inform model legislation for sustainable soil management in Africa. While Kenya has no comprehensive soil legislation, efforts are underway with the National Agricultural Soil Management Policy and a forthcoming bill. The chapter explores existing laws with implicit or explicit soil protection elements, reviews soil-related governance and drivers of degradation, and traces soil protection narratives throughout Kenya's history.

The chapter is structured to provide background on Kenya's demography, soil types, climate, and economy; analyse the main drivers of soil degradation; provide the historical context of soil legislation; and recommend future soil protection laws.

1.1 Religion

The main religions practised in Kenya include Christianity, Islam, Hinduism, and traditional African religions. Christianity, particularly Catholicism and Protestantism, has had a significant presence since its introduction during colonial times. However, in

4 Allan (2008).
5 Howard (2015).

recent decades, Pentecostal churches and Islam have gained more followers, reducing the dominance of traditional Christian denominations. Despite colonial efforts to suppress African religions, traditional beliefs persist, although their numbers are difficult to quantify. These indigenous beliefs continue to influence the practice of introduced religions in Kenya.

1.2 Climatic conditions

Kenya has a moderate tropical climate, influenced by topographical features such as Mount Kenya, Mount Elgon, the Aberdare Range, and the Mau Range, as well as the movement of the Intertropical Convergence Zone (ITCZ). Large water bodies, such as Lake Victoria and the Indian Ocean, also affect rainfall patterns. The coastal region experiences a relatively wet tropical belt, while the inland areas are predominantly arid and semi-arid. Kenya has two main rainfall seasons: the 'long rains' (March-May) and the 'short rains' (October–December). The country has an average annual rainfall of about 680 mm, but this is unevenly distributed, ranging from 200 mm in arid zones to over 2,000 mm in humid areas. As a result, Kenya often faces insufficient and erratic rainfall, leading to frequent droughts and occasional floods, which significantly impact the economy, particularly the rain-fed agriculture sector.

1.3 Population

According to the 2009 census, Kenya's population was 38.6 million,[6] which rose to 47.6 million in 2019 and is projected to reach 56.1 million in 2024.[7] The population more than tripled between 1969 and 2009, from 10.9 million.[8] The annual growth rate decreased from 2.9% in 2009[9] to 2.2% in 2019.[10] Kenya's population is concentrated in the central and western parts,[11] with the most densely populated counties being Nairobi (4,397,073), Kiambu (2,417,735), Nakuru (2,162,202), Kakamega (1,867,579), and Bungoma (1,670,570). Less populous counties include Lamu (143,920), Isiolo (268,002), Samburu (310,327), and Taita Taveta (340,671). Approximately 40% of the population is under the age of fifteen.[12] Around 75% of the population lives in medium to high-potential agricultural areas, which constitute 20% of the land, while the rest

6 See https://www.knbs.or.ke/?p=5621, accessed 1 February 2021.
7 Government of Kenya (2019a).
8 Ibid: 5.
9 See https://data.worldbank.org/indicator/SP.POP.GROW?locations=KE, accessed 1 February 2021.
10 Government of Kenya (2019a).
11 Ibid: 11.
12 Government of Kenya (2019b:12).

live in arid and semi-arid regions.[13] In 2015/2016, literacy rates for those aged 15 and above were 84.5%, with urban areas at 93.2% and rural areas at 78.8%.[14]

1.4 The economy

Kenya's economy is primarily driven by agriculture, natural resources, energy, manufacturing, construction, transport, tourism, and information and communication technology. Agriculture, being climate-dependent, directly contributes 26% of the gross domestic product (GDP) and another 27% indirectly through its connections to other sectors.[15] The sector employs over 40% of the population, with more than 70% of Kenya's rural population relying on it. It accounts for 65% of export earnings and supports the livelihoods of more than 80% of the population, while also contributing to nutrition through the production of diverse, nutrient-dense foods. Agriculture is also a key driver of the non-agricultural economy, including manufacturing, transportation, construction, and social services, making soil management and regulation vital for the economy.

In 2018, Kenya's real GDP grew by 6.3%, up from 4.9% in 2017.[16] This growth was largely due to increased agricultural production, manufacturing activities, and a vibrant service sector.[17] The agriculture, forestry, and fishing sectors saw significant growth, with favourable weather conditions contributing to a 6.4% growth in agriculture, up from 1.9% in 2017. However, by June 2018, Kenya's public debt had risen to KSh4.54 trillion, with 56.6% of this debt being external.[18] This includes KSh829.8 billion from multilateral agencies and KSh480 billion from external bonds.[19] By October 2019, the national debt had increased to KSh5.9 trillion, representing 59.9% of GDP, up from KSh1.89 trillion in 2013, highlighting the country's growing debt burden.[20]

1.5 Kenya's political system and governance

Kenya's sovereign power, as outlined in the 2010 Constitution, is vested in the people of Kenya (Article 1(1)). This power is exercised either directly or through elected representatives at both national and county levels, under the system of devolved

13 Government of Kenya (2019a: 11).
14 Kenya National Bureau of Statistics (2018: 83).
15 See www.fao.org/kenya/fao-in-kenya/kenya-at-a-glance/en/, accessed 8 May 2019.
16 Kenya National Bureau of Statistics (2019: 1).
17 Ibid: 2.
18 Ibid: 1.
19 Ibid: 80.
20 Herbling (2019); Owino & Mutua (2019: 6).

governance (Article 1(2)). The Constitution delegates sovereign power to various branches of government: the National Executive, legislative assemblies in county governments, the Judiciary, and independent tribunals (Article 1(3)). These governments at the national and county levels are distinct yet interdependent, maintaining their relationships based on consultation and cooperation (Article 6(2)).

The National Executive comprises the President, the Deputy President, and the Cabinet (Article 130(1)). The President is both the head of state and government, as well as the Commander-in-Chief of the Kenya Defence Forces (Article 131(1)). The Cabinet consists of the President, the Deputy President, the Attorney General, and between fourteen to 22 Cabinet Secretaries, each responsible for different sectors (Article 152(1)). These Cabinet Secretaries are appointed by the President but must be approved by the National Assembly (Article 152(2)). For example, there are Cabinet Secretaries dedicated to the environment and land. Under the Cabinet Secretaries are Chief Administrative Secretaries and Principal Secretaries, who carry out functions under designated directorates.

Parliament is bicameral, consisting of the National Assembly and the Senate, with a total of 418 members, including the speakers of both Houses (Articles 93 and 97-98).

The Constitution also establishes 47 counties, each with its own government (Article 6(1)). A county government comprises a county assembly and a county executive (Article 176(1)). The county assembly, which is made up of elected members from the county's wards, is responsible for making laws that are necessary for the county's effective governance (Article 177). The executive authority is vested in the county executive committee, which includes the county governor, the deputy governor, and other members appointed by the governor with approval from the county assembly (Article 179). The county executive committee is tasked with implementing county legislation, managing county functions, and coordinating administration within the county (Article 183). Additionally, it may propose new legislation for consideration by the county assembly (Article 185(1)).

The county assemblies are empowered to make laws related to the performance of county functions, and they oversee the work of the county executive committee (Article 185(2)). Counties have enacted legislation on issues such as climate change, quarrying, charcoal burning, and land use.[21] They are also responsible for overseeing the implementation of both county and national laws within their jurisdictions (Article 185).

21 See the examples of Makueni, Kericho, and Kitui. It is worth noting that many of these legislations address the collection of fees and not the unsustainability of the practices. Counties such as Kitui have, however, banned charcoal burning.

1.6 Legislative authority

Kenya's legal and policy framework on soil governance is primarily integrated into land law, which has historically concentrated on land rights rather than land use.[22] Soil-specific management and conservation have not been sufficiently addressed, and the law is often applied generically without considering the diverse soil types and management needs across the country. Until 2010, the National Assembly was the sole legislative body, but with the introduction of devolved governance, the 47 county assemblies now play a crucial role in lawmaking at the local level.

Article 185 of the Constitution empowers county assemblies to make laws necessary for the effective performance of county functions, including environmental and natural resource management. Under the Fourth Schedule, the national government is responsible for formulating policies related to environmental conservation, land, and agriculture. The county governments are tasked with implementing these policies at the local level, including those addressing soil and water conservation.

Given the diversity of soil types across the country, the need for soil-specific protection measures is clear. Counties can create tailored soil governance legislation that addresses the unique soil challenges and requirements in different regions. With devolved governance, county governments are also expected to improve law enforcement and strengthen agricultural and soil extension services, which are key to monitoring soil fertility, combating degradation, and promoting sustainable agricultural practices. By focusing on soil health and nutrient replenishment, county governments can help reduce soil degradation and contribute to increased food production, ultimately fostering healthier soils and more resilient agricultural systems.

1.7 Environmental dispute resolution

Kenya's judiciary, which is independent as per Article 160 of the Constitution, plays a vital role in the governance and protection of soil and the environment. The Constitution ensures judicial independence by providing judicial officers with security of tenure and protection from external influence, including from the executive. However, despite this constitutional safeguard, challenges remain, particularly regarding underfunding, which has limited the judiciary's capacity to function effectively.[23] The judiciary's independence has been further compromised by occasional smear campaigns targeting judges, especially those who make rulings not aligned with the executive's interests.[24]

22 National Land Policy 2009; National Land Use Policy 2017.
23 Namusyule & Mueni (2018); Ogemba & Muthoni (2019).
24 See https://bit.ly/3d7B9aQ, accessed 1 November 2019.

The Environment and Land Court (ELC) has a central role in addressing environmental and soil-related issues. The court is empowered to adjudicate disputes on land, environmental degradation, and conservation, with the ability to issue orders for environmental restoration and rehabilitation. Importantly, the ELC has been proactive in enforcing constitutional provisions that protect environmental rights, ensuring sustainable development and environmental preservation.

A key case, *Patrick Musimba v National Land Commission* [2016] eKLR, highlighted the constitutional duty of the state to promote sustainable development and ensure access to a clean and healthy environment. The court emphasised the importance of public participation in environmental governance, as mandated by Article 69 of the Constitution. Similarly, in *Save Lamu v National Environmental Management Authority* [2019], the National Environment Tribunal halted a coal project due to inadequate environmental impact assessments and insufficient public participation, underscoring the importance of transparent, informed decision-making processes in environmental governance.

The ELC also affirmed the minimum requirements for effective public participation in environmental matters in *Mui Coal Basin Local Community v Permanent Secretary Ministry of Energy* [2012] Petition No. 305, asserting that public participation must be tailored to the specific context and should guarantee access to relevant information.

Additionally, Kenya's legal framework recognises the importance of alternative dispute resolution, particularly in community land matters, where over 60% of Kenya's land is categorised as community land. The National Land Commission promotes the resolution of land disputes through traditional means, which can significantly influence soil governance and conservation efforts.

In sum, the judiciary, particularly through the ELC, has played an instrumental role in advancing soil and environmental protection in Kenya. However, it continues to face challenges related to funding and external interference, which could impact its effectiveness in the long term. Nonetheless, the court's role in ensuring environmental rights and promoting public participation remains a crucial avenue for advancing sustainable soil governance.

2 Main drivers of soil degradation

Agriculture, the backbone of Kenya's economy, involves soil cultivation, crop production, and livestock rearing. Despite being the fourth-largest economy in sub-Saharan Africa, Kenya faces challenges with its population nearly doubling since 1989 while arable land—only 10% of the country's landmass—continues to decline.[25] Expanding

25 Mohajan (2014); Mwanza (2019).

urban areas, including Kiambu and Nakuru counties, are converting fertile farmland into infrastructure, increasing pressure on the diminishing agricultural soil to meet growing food demands.

Soil and environmental degradation in Kenya are rising, driven by both natural factors and human activities. Climate change, urbanisation, soil erosion, overgrazing, over-cultivation, compaction, industrial activities, illegal land allocations, and encroachment on sensitive areas are all contributing to the loss of soil fertility and biodiversity.

2.1 Kenya soil profile: Soil types, distribution, and degradation vulnerability

Kenya's soils are diverse, ranging from sandy to clayey and low to high fertility, influenced by geology, terrain, and climate.[26] However, many face issues such as salinity, acidity, low fertility, and poor drainage. The country has 25 major soil types, with fifteen dominant ones, including Nitisols, Regosols, Cambisols, Luvisols, and Ferralsols.[27] While 59% of Kenya's soils are moderately to highly fertile, they face significant challenges.[28]

Nitisols, found in the central highlands, are highly productive but require manure and inorganic fertilisers to maintain fertility. Counterfeit fertilisers, such as those with harmful metals, undermine soil health. Andosols, occurring in areas with steep slopes and high rainfall, are prone to erosion and leaching, requiring liming and fertilisers to improve productivity.

Acrisols, Alisols, Lixisols, and Luvisols, common in coffee-growing zones, are acidic and low in nutrients, requiring fertilisers and erosion control. The combination of Nitisols and Andosols, particularly in densely populated areas, further strains soil resources.

Planosols and Vertisols, found in rice-growing regions, suffer from poor drainage due to high clay content and require careful irrigation management. Their vulnerability is heightened by using substandard chemicals and wastewater in irrigation.[29] Ferralsols, found in older, leached areas, are nutrient-poor and require fertilisers and organic matter management to maintain productivity.[30]

26 Government of Kenya (2016b: 30).
27 Ibid.: 30-31.
28 Ibid.: 32.
29 Nyabonyi (2016).
30 Government of Kenya (2016b: 33).

2.2 Challenges that face Kenyan soils

The national soil management policy in Kenya highlights several challenges facing agricultural soil, including the lack of responsibility for soil and water conservation on communally owned land, inadequate investments in conservation, and insufficient development and use of land use plans. Unsustainable farming practices, encroachment into environmentally fragile areas, and limited capacity for soil and water conservation are also major concerns. Additionally, there is inadequate research and dissemination of conservation technologies, poor coordination among stakeholders, and a lack of extension services. The high cost of conservation activities and inadequate awareness of soil degradation further exacerbate the issue. Furthermore, there is insufficient quality control on agrochemicals, a lack of standards and soil testing facilities, and weak enforcement of environmental laws. Uncoordinated research, inadequate legal and regulatory frameworks, and land tenure issues compound the problem. The country is also ill-prepared for climate risks, with indigenous knowledge of soil conservation often overlooked. The high cost and untimely availability of fertilisers, conflicting policies among state agencies, and the absence of gender-sensitive soil management technologies add to the complexity of addressing these challenges.

2.3 The main drivers of soil degradation

Soil degradation in Kenya refers to the decline in soil quality and fertility caused by both human activities and natural processes. This includes physical, chemical, and biological degradation, resulting in reduced agricultural productivity, loss of ecosystem services, and increased vulnerability to droughts and floods. Overuse of chemicals, fertilisers, and fungicides has poisoned and compacted soils, while industrial and urban waste contributes to further degradation.[31] Soil compaction is a major issue, especially in high livestock-density areas, leading to reduced infiltration and increased runoff, soil erosion, and gullying.[32] Salinity and sodicity affect about 40% of Kenya's land, particularly in arid and semi-arid regions.[33] High soil erodibility, influenced by soil texture and human activities, leads to soil erosion, particularly in areas with poor vegetation cover or steep slopes.[34] Erosion is worsened by unsustainable farming practices, including overgrazing, shifting cultivation, and improper ploughing techniques.[35] This degradation results in reduced soil functions, increased flooding risks, and the need for more chemicals to maintain productivity, perpetuating further soil and

31 Kenya Land Alliance (2003: 43).
32 Government of Kenya (2016b: 66).
33 Ibid.: 68.
34 Ibid.: 65.
35 Kenya Land Alliance (2003: 37).

water pollution. Additionally, human activities such as deforestation, pollution, and unsustainable land use practices exacerbate the problem. The loss of biodiversity, driven by land degradation, climate change, and invasive species, further threatens soil conservation.[36]

2.3.1 Agriculture

Agriculture is crucial to Kenya's economy, practised across large, small, and subsistence scales. However, rapid urbanisation is converting arable land into concrete spaces, putting immense pressure on the remaining farmlands to feed the growing population. This is coupled with increased mechanisation, technology use, and reliance on agrochemicals. The importation of substandard fertilisers has led to soil and water pollution, particularly in irrigation schemes such as the Mwea Rice Scheme.

Kenya's agricultural extension services, though recognised for improving productivity, remain inadequate, contributing to poor soil nutrition and over-reliance on agrochemicals.[37] Unsustainable farming practices such as land clearing, overgrazing, and bush burning further degrade soil fertility.[38] The country's population growth and food demand have driven agricultural expansion, but limited land resources and over-reliance on land have resulted in nutrient depletion and the breakdown of traditional soil management practices.[39]

Most farming in Kenya is subsistence-based, with smallholder farmers using outdated methods including burning vegetation to cultivate virgin land.[40] This contributes to carbon buildup in the soil. Many farmers cultivate on steep slopes and fragile soils, which are prone to erosion. The over-cultivation of land without adequate soil restoration leads to reduced productivity and soil degradation. Nutrient loss, estimated at 112 kg of nitrogen, 2.5 kg of phosphorus, and 70 kg of potassium in the highlands, further impacts land productivity and water quality.

2.3.2 Mining

Kenya is rich in minerals such as fluorspar in Kerio Valley, gold in the west, titanium along the coast, and soda ash in Kajiado and coastal areas. Other resources include manganese, iron ore, gypsum, diatomite, and silica sand. Anticipating discoveries, Kenya adopted its first mining policy in 2016 to maximise future benefits.

36 Government of Kenya (2016b: 65); Government of Kenya (2013a: 14).
37 Muyanga & Thomas (2006).
38 Government of Kenya (2018b: 45).
39 Ibid.: 53.
40 Government of Kenya (2016b: 67).

However, heavy mining and quarrying have led to biodiversity loss, soil erosion, chemical contamination, and water pollution.[41] Although the Environmental Management and Coordination Act (EMCA) mandates Environmental Impact Assessments (EIAs) for projects, enforcement is weak. Many EIAs in mining fail to meet legal standards, as seen in *Cortec Mining Kenya Limited v Cabinet Secretary Ministry of Mining* [2017] eKLR and *Save Lamu v NEMA* [2019] eKLR, where activities proceeded without proper assessments. These instances highlight the disregard for environmental laws essential for soil and ecosystem protection.

2.3.3 Industrial activities

Kenya's growing industrial sector, serving local and export markets, is concentrated in cities and agriculturally rich areas for value addition. Industrialisation is a government priority to boost employment and the economy.[42] However, industrial activities often lead to soil pollution. A 2015 study revealed persistent organic pollutants in soils near industrial zones and declining soil fertility in high-activity areas.

Despite the EMCA, which prohibits soil pollution and unregulated waste discharge, enforcement is weak. Industries frequently discharge effluents into rivers and soils, as seen in *Benson Ambuti Adega v Kibos Sugar and Allied Industries* [2019] eKLR, where Kibos Sugar Factory was repeatedly penalised for environmental violations.[43] EMCA designates the National Environment and Coordination Authority (NEMA) as the lead agency for environmental protection, but overlapping institutional roles often lead to inaction and blame-shifting, hindering effective pollution control.

2.3.4 Unregulated urban and infrastructural development

Over the past two decades, Kenya's population has doubled, with rapid rural-to-urban migration driving urban growth.[44] The urban population rose from 5.4 million in 1999 to 12.2 million in 2009 and was projected to reach 17.6 million by 2017, representing 39% of the total population and an annual urban growth rate of 7.5%. County governments have also spurred urbanisation, particularly in the 47-county headquarters. However, planning laws have lagged, resulting in inadequate housing, sanitation, and infrastructure.

Urban expansion has replaced fertile agricultural lands with concrete structures, reducing vegetation and forest cover and intensifying pressure on remaining

41 David et al. (2016); Mutono (2016).
42 Government of Kenya (2017a).
43 Allan (2019).
44 Ministry of Land and Urban Planning (2017).

productive soils. Government-supported infrastructure projects, such as affordable housing initiatives, road expansions, the Standard Gauge Railway, and the Mombasa-Nairobi petroleum pipeline, have further degraded soils.[45] These developments lead to soil sealing, compaction, topsoil loss, biodiversity reduction, and contamination risks. For example, pipeline leaks in Makueni have polluted soils and water, posing health and fire hazards to communities and livestock.

2.3.5 Climate change

Soil serves as the planet's largest natural reservoir of carbon, storing more carbon-containing compounds than the combined total of the Earth's biomass and atmosphere. Soil organic carbon comes from microbes, fungi, invertebrates, root matter, and decomposing vegetation. However, Kenya faces significant challenges related to climate change,[46] including rising temperatures, unpredictable rainfall, and increasing loss of soil organic carbon—an indicator of land degradation that threatens biodiversity, sustainable development, and climate adaptation.[47]

Over 70% of natural disasters in Kenya are linked to extreme climate events such as droughts and floods, both of which exacerbate soil degradation. Floods, caused by reduced vegetation and poor rainfall infiltration, lead to soil erosion, loss of property, and displacement.[48] Counties such as Garissa, Tana River, Kisumu, and Busia are particularly flood-prone, with major floods recorded during the 1997/1998 El Niño event, affecting 1.5 million people, and subsequent years including 2012.

Droughts are a recurring challenge, especially in arid and semi-arid regions, with increasing frequency and severity over recent decades. Notable droughts occurred in 1972, 1984, 1991, and as recently as 2010/2011, with drought events now happening every two years.[49] These droughts destroy vegetation, leaving the land vulnerable to erosion by wind and water, compounding Kenya's soil degradation crisis.

2.3.6 Brownfield sites

Brownfield sites are underutilised or abandoned lands, often associated with actual or perceived contamination from previous uses, but they hold potential for redevelopment or reuse.[50] In Kenya, many industrial sites have been abandoned due to the relocation

45 Kenya National Bureau of Statistics (2018: 174).
46 Ministry of Foreign Affairs of Netherlands (2018).
47 Government of Kenya (2016b: 64).
48 Ibid.: 62.
49 Ibid.: 64.
50 Kazungu et al. (2011).

of industries to areas such as the Athi River. These sites face significant challenges, including land-cover changes, loss of organic matter, altered soil structure, compaction, and reduced fertility. Despite these constraints, some brownfield sites may offer advantages such as existing infrastructure and desirable locations, making them viable for redevelopment with proper planning and remediation.

2.3.7 Deforestation

Forest ecosystems play a vital role in conserving soil, water, and biodiversity while moderating the climate. However, Kenya's public and community forests have faced significant threats from human activities such as charcoal burning, illegal logging, overgrazing, and encroachment.[51] This has resulted in the loss of approximately 5,000 hectares of forest annually, causing extensive soil erosion in Leroghi, Ndoto, and Mount Nyiru forest reserves.

Despite these challenges, Kenya's forest cover increased from 7.2% in 2013 to 7.29% in 2017, with the government aiming to achieve 10% tree cover by 2022.[52] The consequences of deforestation include increased runoff, nutrient cycle disruption, higher soil temperatures, reduced organic matter input, loss of tree cover, and biodiversity decline.

2.3.8 Overgrazing

Rangelands, covering about 70% of Kenya's total area, are crucial to the country's economy.[53] Predominantly located in arid and semi-arid regions, these lands are home to pastoralists and agro-pastoralists who face growing competition from farmers migrating from overcrowded, higher-potential areas.

Rangeland degradation is marked by vegetation loss and increased bare soil, primarily caused by livestock overgrazing. Overgrazing exposes soil to wind and water erosion, while excessive trampling by livestock and wildlife compacts the soil, reducing its infiltration capacity.[54] These factors contribute to increased runoff, desertification, biodiversity loss, and overall soil degradation.

51 Government of Kenya (2018c: 28).
52 Government of Kenya (2018b: 85); See https://bit.ly/3cumZ33, accessed 1 February 2021.
53 Ibid.: 76.
54 Hannam & Boer (2004: 4).

2.3.9 Topographic features

Kenya's diverse topography, with its steep mountains, hills, and highlands, makes the country particularly vulnerable to soil erosion. These steep slopes facilitate excessive water runoff, significantly contributing to land degradation.

For example, in the upper Tana River sub-catchments of Thika and Chania, 66% of farmers cultivate very steep slopes, which are prone to severe runoff. Studies in the Central Highlands have documented soil losses of up to 247 tons per hectare annually on steep slopes in high-potential areas. Similarly, in the steep agricultural lands of Taita Taveta, approximately 50% of the land has been affected by rill and gully erosion, highlighting the urgent need for sustainable land management practices.

2.3.10 Land tenure

The land tenure system defines how ownership, access, and use of land rights are structured within a society or country. In Kenya, land tenure is categorised into three major groups: public, private, and community land. Public or state-owned land, which includes national parks, forest reserves, and government agricultural land, constitutes about 10% of the total land area and is governed by the Constitution and the Land Act 2012. This land faces challenges relating to encroachment and mismanagement, leading to deforestation and biodiversity loss. Private land, owned by individuals or legal entities, accounts for 20% of the land and is governed by the Land Act and the Land Registration Act 2012. Over-subdivision and intensive exploitation of private land contribute to soil degradation, and the high costs of soil conservation discourage private landowners from investing in such practices. Community land, comprising over 70% of the total land area, is held collectively by communities and managed according to traditional systems. It includes customary community land, trust land, and group ranches, and is regulated by the Community Land Act 2016. While the Act recognises communities' rights over ancestral lands, communal ownership often results in a lack of accountability for soil conservation, as no individual feels responsible. The National Agricultural Soil Management Policy of 2023 emphasises that both communal and private landowners are not motivated to invest in soil conservation due to its high costs, exacerbating soil degradation across Kenya. Effective soil management requires addressing these issues through policies that incentivise sustainable practices and promote responsibility among all land tenure groups.

2.3.11 Poverty

Poverty is a significant driver of soil degradation in Kenya. It compels people to encroach on marginal lands and forests in search of resources for survival. The need for income often leads to harmful practices such as illegal charcoal burning and the collection of firewood, both of which contribute to deforestation. These activities degrade the land, reducing its fertility and making it more vulnerable to erosion. The resulting loss of vegetation cover further exacerbates soil degradation, creating a vicious cycle where poverty fuels environmental harm, which in turn deepens the poverty of affected communities. Sustainable solutions are needed to break this cycle, including poverty reduction strategies and programs that promote land conservation.

2.3.12 Encroachment of freshwater and wetland ecosystems

Freshwater resources and wetlands are crucial for soil formation, nutrient cycling, and providing habitats for species. Wetlands help regulate water flow, control floods, and prevent soil erosion by absorbing excess stormwater and slowing floodwater, which reduces downstream flood volumes.[55] They also protect soil from wind and wave damage. However, wetlands face threats from population pressure, land use changes, pollution, and climate variability, leading to degradation and loss of ecosystem services. Illegal land allocations around riparian areas, including commercial developments, have cleared vital riparian vegetation, worsening soil erosion.[56] The Kenyan government is working to reclaim riparian land and demolish illegal structures.

2.4 Key actors in soil degradation

2.4.1 Investors

Local and international investors involved in agriculture, mining, and infrastructure development contribute to soil degradation. Therefore, it is crucial to involve them in interventions to combat soil degradation. These interventions should include incentives to promote sustainable soil management and sanctions to deter harmful activities.

55 National Wetlands Conservation and Management Policy (2014: 6).
56 Commission of Inquiry (2004).

2.4.2 Government

National and county governments, as landowners and custodians, play a crucial role in soil degradation. They are responsible for land use planning, allocation, and managing activities on land. Engaging their leadership is essential for comprehensively addressing soil degradation.

2.4.3 Farmers

Farmers, both on community and private land, are key actors in soil degradation. To address this, initiatives should focus on educating and providing extension services to farmers, promoting sustainable practices and reducing soil contamination from chemicals. Engaging both large- and small-scale farmers is essential, as they play a central role in soil-related activities.

2.4.4 Pastoralists

Pastoralists in arid and semi-arid lands contribute to soil degradation through unsustainable rangeland management and overstocking. The soils around watering points are often compacted, leading to further degradation. Targeted education and extension services can help address these practices, promoting better soil health and ecosystem integrity, and, ultimately, benefiting the land users.

2.5 Conclusion

Soil degradation in Kenya, where agriculture accounts for 24% of the GDP, has severe consequences. The main drivers include agriculture, mining, unsustainable land use, urban sprawl, climate change, soil erosion, deforestation, and overgrazing. Other contributing factors are soil compaction, sodicity, erodibility, poverty, loss of biodiversity, and land tenure systems. As Kenya experiences rapid development, population growth, and industrialisation, it must address these biological, natural, and physical drivers of soil degradation. The introduction of devolution presents an opportunity to implement more specific soil legislation at the county level.

3 Background on soil legislation

3.1 Historical perspective

Kenya's establishment as a British colony was influenced by the strategic importance of the Suez Canal and the need to expand the British Empire.[57] From 1895 to 1963, legislation facilitated the consolidation of land by settlers, while Africans were moved to native reserves. Colonial laws did not directly address soil conservation but destabilised local communities and disrupted the relationship between people and their environment, leading to overuse and soil degradation.[58] Land acquisition for settlers was politically driven, with legal instruments giving binding force to decisions.[59] The 1894 Indian Lands Acquisition Act extended to the East African Protectorate in 1899, allowing land to be declared Crown lands or granted to individuals.[60] The 1901 East Africa (Lands) Order-in-Council defined Crown lands as public lands controlled by the British.[61] Settlers struggled to acquire land from natives due to differing views on land ownership,[62] with Africans seeing land as communal and inalienable.[63] This has had lasting impacts on Kenyan land law and policy.

3.2 Colonial laws, policies, and plans

3.2.1 Crown Lands Ordinance, No. 21 of 1902

The Crown Lands Ordinance, No. 21 of 1902, was introduced under pressure from settlers, granting the commissioner the power to sell freeholds in Crown land to purchasers in lots up to 1,000 acres.[64] This gave colonial authorities broad discretion to define waste and unoccupied land, often disregarding native land rights. Native rights were viewed as temporary and could be extinguished if the land was not actively

57 Mungeam (1966); Wolff (1974).
58 See e.g. Lugard (1929) on the effects of colonialism on the institution of traditional chiefs in Kenya; see also Huxley (1935).
59 Kameri-Mbote (2002).
60 See Palley (1966: 82) quoting the Report of the Foreign Office FOCP 7403 No. 101.
61 See Sec 1 of the East African Order-in-Council, 1901, passed at the Court of St. James on 8 August 1901.
62 For some time, the colonial officers considered themselves unable to grant anything more than temporary certificates of occupancy, which the early settlers found unacceptable.
63 Bentsi-Enchill (1964); See the case of *Mulwa Gwanobi v Alidina Visram* (1913) 5 K.L.R. 141 involving the sale of land by members of the Jibana tribe, where the court held that what the tribe members sold were rights to occupy and reap fruits from the land and not absolute rights as the purchaser would have had the court believe. In the judge's view, the members of the tribal community had only a right of occupancy and they could, consequently, not pass on by sale a right greater than the one of occupancy.
64 See Sec 4 of the Crown Lands Ordinance 1902.

occupied, a perspective that marginalised nomadic communities such as the Maasai and those practising shifting cultivation.[65] The ordinance allowed the Crown to grant land, including native settlements, and once native occupancy ceased, ownership would transfer to the grantee. This effectively turned communal resources into open-access lands, encouraging settlement but undervaluing native communities' ability to develop the land.[66] The low price and rent offered to settlers reflected colonial authorities' belief that natives could not develop the land as envisioned for Kenya's future.

3.2.2 Crown Lands Ordinance, 1915

The Crown Lands Ordinance of 1915 declared all land in the protectorate to be Crown land, regardless of native occupation or reservation for native use.[67] It allowed for 999-year leases, though settlers pushed for perpetual leases.[68] In the case of *Isaka Wainaina v Murito wa Indagara*, Chief Justice Barth ruled that Africans were merely tenants of the Crown, with temporary land rights.[69] Section 54 gave the governor the power to reserve land for native tribes, leading to the establishment of 24 African reserves in 1926.[70] However, these reserves lacked the security of tenure. The population increase in these reserves contributed to soil degradation, as evidenced by Leakey's 1933 testimony on the Kikuyu reserves.[71] His suggestion to expand the Kikuyu land by 2,000 square miles from the forest reserve was rejected, fuelling a protracted struggle for independence, with land as the central issue. The forced expropriation of native land had lasting consequences on land health, soil quality, and resource management.

3.2.3 Native Lands Trust Ordinance, 1938

Section 65(1) of the Native Lands Trust Ordinance of 1938 granted the governor the authority to create rules on several matters related to land and soil management in native reserves, including: Controlling occupation and use of native reserves for grazing and pasturing livestock; reducing the number of livestock in any native land unit; regulating the reconditioning of native land, including prohibiting and regulating the

65 See *Sobhuza II v Miller* [1926] A.C. 518 at 525.
66 See, e.g. Bondi & Mugabe (1996) arguing that environmental degradation manifests in regions under customary land tenure is largely due to interference in rural resource management by a "modernising" nation-state rather than the "inherent vices" of customary property relations; see also Gadgil (1989).
67 See Sec 5 of the Crown Lands Ordinance, 18 May 1915.
68 Ibid.: Sec 34.
69 Kenya Law Reports (1922–23) Vol. IX 102.
70 Kakumu (1996).
71 Corray (1978).

occupation of certain areas; general regulation of land use and conservation in native reserves; issuing licenses for cattle grazing rights and the removal of timber, forest products, sand, limestone, and other minerals (except surface salt); and protecting trees and forest products on land not covered by the Forest Ordinance, and regulating the felling and removal of such trees or products.

These provisions aimed to manage and conserve the land and its resources, but they were largely centred on control by colonial authorities, with limited empowerment of local communities.

3.2.4 Agricultural Policy, 1944

The Agricultural Policy of 1944 was introduced towards the end of World War II, during a period of food scarcity exacerbated by drought. The policy, inspired by Humphrey Norman's proposals, included suggestions such as moving Africans exceeding the land's carrying capacity to less populated areas and focusing on new agricultural methods and drought-resistant crops. It also advocated for communal cultivation to promote cooperation in soil conservation. In 1945, elders in Nyeri initiated a trial care program for their lands, where women were required to dig terraces twice a week, leading to impressive results. However, this initiative was halted in 1948 when Jomo Kenyatta, in a Kenya African Union speech, opposed compulsory labour for women on the terraces. This highlights the community's enthusiasm for soil care, the key role of women, and political interference that overlooked the benefits of soil conservation efforts.

3.2.5 African Courts Ordinance, 1951

The African Courts Ordinance of 1951 established that courts would be composed of elders appointed by the provincial commissioner, with jurisdiction over all Africans.[72] Administrative officers, including the district officer and the provincial commissioner, supervised these courts.[73] During this period, the Native Authority of the clans was recognised, allowing them to make rules and orders on crucial matters such as soil conservation. The African courts were responsible for addressing breaches of these rules and orders.[74]

72 The African Courts Ordinance of 1951, Sec 4.
73 Ibid.: Sec 1(b).
74 Munro (1959).

3.2.6 Swynnerton Plan, 1954

By 1940, land shortages in the reserves and demands for the return of stolen lands led to the Mau Mau revolt in 1952, primarily led by the Kikuyu.[75] This forced the colonial administration to address tenure reform. Colonial experts saw African land tenure as problematic, viewing it as a non-property system that hindered agricultural development. The division of land through inheritance led to reduced productivity and soil degradation.

The solution was individualised land titles and intensified agriculture. A commission was established to investigate tenure systems, leading to the Swynnerton Plan of 1954, which recommended consolidating family land holdings and granting individual property rights to increase agricultural productivity.[76] Soil conservation was essential to this plan.

Soil erosion had been a concern since the 1920s, and compulsory terracing schemes, including the Muhiriga system, were introduced in the 1940s.[77] These schemes were unpopular as their benefits were unclear, and their enforced communal nature led to resentment. Many terraces were abandoned by the early 1960s, with little improvement in terracing between 1948 and 1961 in areas such as Kangundo and Masii.

3.3 Selected soil conservation initiatives in post-independence Kenya

After independence, terracing was revitalised and carried out voluntarily. Farmers began constructing terraces shortly after opening new land, even in the drier, warmer, and less steep areas such as Makueni, which were settled after 1945.[78] By 1978, nearly all arable land in these areas was terraced, with significant progress made between 1961 and 1978 as the population grew. By 1990, erosion on arable land was largely under control, although grazing land was still facing challenges.

In the 1970s, growing concern about the future of farmland sparked increased participation in soil and water conservation efforts. Erosion worsened due to expanding crop areas and recurring droughts, especially affecting maize yields. Unlike in colonial times, enforced conservation was ineffective, but by the 1970s, farmers were more receptive to advice, seeing the potential benefits. Increased community awareness and participation in decision-making played a key role in the success of conservation efforts.

75 See Swynnerton (1954).
76 See Osolo-Nasubo (1977).
77 Karuku & International Network for Natural Sciences (2018: 123).
78 Ibid.: 124.

Several projects aimed at improving crop and livestock productivity were initiated, though not tied to national laws or policies. These projects laid the foundation for soil protection and offer valuable lessons for future soil legislation in Kenya.

3.3.1 National Soil and Water Conservation Project

The National Soil and Water Conservation Project, funded by the Government of Kenya and the Swedish International Development Agency from 1974 to 1994, aimed to improve food security and living standards through effective conservation practices.[79] It focused on eroded fields, particularly using the *fanya juu* terracing technique to conserve soil and rainwater. The project's goal was to maintain rainfall where it fell and prevent soil loss, improving crop conditions both short-term and long-term.

In 1987, the project shifted to a catchment-based approach, organising farmers into groups within shared hydrological areas. Activities included gully control, tree planting, and riverbank protection. Tools and materials such as farm tools and agroforestry seeds were provided. A shifting approach focused on one catchment area per year, with farmers expected to continue activities after the project's involvement.

While the project successfully simplified extension messages and engaged farmers, it was ultimately unsustainable. After donor support ended, community activities collapsed, and catchment committees ceased their roles.

3.3.2 Permanent Presidential Commission on Soil Conservation and Afforestation

In 1981, President Moi established the Permanent Presidential Commission on Soil Conservation and Afforestation under the authority of Sections 23 and 24 of the 1969 Constitution, which allowed the President to create and abolish offices in the public interest. This decision came after recognising that the Ministry of Agriculture's bureaucratic structure was insufficient to address soil conservation effectively.[80] The commission had a broad mandate to address soil conservation without needing to amend its objectives. It focused on afforestation, soil conservation strategies, policy formulation, public education, and coordination of government efforts. One notable achievement was the establishment of presidential soil conservation sites across the country, such as those in Machakos, including Mwanyani (1982), Uuni (1984), and Masinga (1985). During Moi's presidency, various authorities were created to oversee soil conservation and protection efforts.[81]

79 Mutisya et al. (2010: 8).
80 Bragdon (1990).
81 Gichuki (1991).

3.4 Types of conservation measure that have been used in Kenya over the years

3.4.1 Terraces

Levelled bench terraces and earth bunding are common in Kenya, particularly in the highlands, where steps and crop residues are used to improve soil fertility and water retention.[82] The *fanya juu* earth bunding system traps runoff and sediment but requires significant labour for construction and maintenance. *Fanya chini* is similar, with soil placed on the lower side of the contour trench to conserve soil and divert water.

3.4.2 Conservation agriculture

Conservation agriculture in Kenya focuses on minimal soil disturbance, permanent soil cover, and crop rotation, leading to improved soil organic matter, water retention, and soil structure over time.

3.4.3 Cover crops

Cover crops stabilise soil moisture and temperature, improve soil structure, recycle nutrients, control weeds and pests, and increase organic matter. Common cover crops include velvet bean, hairy vetch, and sun hemp, which help improve soil fertility and reduce erosion.[83]

3.4.4 Green manure

Green manure crops, such as leguminous plants, fix nitrogen in the soil and improve water infiltration.[84] Green manure is comparable to farmyard manure in terms of nutrient addition. Tithonia diversifolia, used in agroforestry systems, provides high-nutrient green biomass.

82 Karuku & International Network for Natural Sciences (2018: 125).
83 Ibid.: 127.
84 Ibid.: 128.

3.4.5 Agroforestry

Agroforestry in Kenya includes fertiliser trees, fodder trees, fruit trees, medicinal plants, and fast-growing timber for timber and fuel, all contributing to soil conservation and improved productivity.[85]

3.4.6 Hedges

Contour hedges, made of trees or shrubs, control erosion, increase water infiltration, and help form terraces, benefiting soil and water conservation.

3.4.7 Improved fallows

Improved fallows involve leaving the land to rest while enriching it with leguminous plants to replenish soil fertility and reduce erosion, improving crop yields in the long term.

3.4.8 Vegetation strips

Vegetation strips of grass, such as Imperata cylindrica and Vetiveria zizanoides, are grown across slopes to reduce runoff, encourage sediment deposition, and aid in terrace formation.

3.4.9 Stone lines

Stone lines along contour lines slow water runoff, reduce erosion, and trap sediment, improving water infiltration and soil preservation, especially in areas with abundant stones.

3.4.10 Conservation and regeneration measures

Measures such as area closure and rotational grazing are used to regenerate vegetation and protect land from overgrazing, improving soil and water quality.[86]

85 Ibid.: 129.
86 Ibid.: 131.

3.4.11 Contour farming

Contour farming involves planting along the contour to reduce water runoff and erosion, with the use of grass barriers to maintain contour lines and improve soil conservation.[87]

3.4.12 Trash lines

Trash lines made of crop residues along contours help slow runoff, enhance infiltration, and improve soil fertility through decomposition, especially in the Tharaka area.

3.4.13 Cut-off drains, retention, and infiltration ditches

Cut-off drains divert surface runoff safely, while retention ditches capture and retain water for infiltration, particularly in semi-arid areas, aiding water conservation.

3.5 Conclusion

Soil degradation in Kenya has been a concern since colonial times, with various measures implemented over the years to address soil erosion and land degradation. These initiatives provide a strong foundation for soil legislation. The widespread negative effects of land degradation, especially in agricultural areas that have become less productive, highlight the need for effective legislation. Additionally, the loss of lives due to floods and landslides, often linked to land degradation, further underscores the urgency for both the enactment and implementation of soil-specific laws.

4 Legislation on the main drivers of soil degradation

Kenya has a plural legal system, including the Constitution, which incorporates international treaties, religious and customary laws, acts of Parliament, and county laws. Many laws are operationalised through subsidiary legislation by ministries, including those responsible for the environment, mining, and agriculture.[88] The Constitution mandates the promotion of science and the protection of indigenous knowledge in national development.[89] Kenya is also party to international treaties addressing soil, such

87 Ibid.: 132.
88 Constitution of Kenya 2010, Art 11.
89 Ibid.: Arts 11(2)(a) & 69(1)(c).

as the United Nations Framework Convention on Climate Change,[90] the United Nations Convention on Biological Diversity,[91] and the United Nations Convention to Combat Desertification,[92] which the Constitution states form part of Kenyan law.[93] However, the application of international law is complex and often requires national legislation for domestication.[94] Kenya's environmental laws incorporate many international norms, and the country is committed to achieving the Sustainable Development Goals (SDGs),[95] which include soil management. Despite a long history of soil conservation efforts, these measures are not directly addressed in laws, missing an opportunity to strengthen soil protection within the legal framework.

4.1 International instruments relevant to soil protection

Kenya has ratified several international treaties, policies, and strategies that, while not always focused solely on soil protection, have significant implications for soil conservation. These include the Declaration on Environment and Development,[96] the World Heritage Convention,[97] the Ramsar Convention on Wetlands,[98] Agenda 21 on Environment and Development,[99] the Rotterdam Convention on Hazardous Chemicals,[100] the Millennium Declaration,[101] the Johannesburg Declaration on Sustainable Development,[102] the Cartagena Protocol on Biosafety (2000),[103] and the Stockholm Convention on Persistent Organic Pollutants (2004).[104] These instruments shape national soil conservation policies, and their relevance to soil protection will be further discussed in the following section.

90 Adopted 9 May 1992, United Nations Treaty Series, Vol 1771.
91 Adopted 5 June 1992, entered into force 29 December 1993.
92 Adopted 17 June 1994, entered into force 26 December 1996.
93 Constitution of Kenya 2010, Art 2(6).
94 Wabwile (2013); Oduor (2014); Kabau & Njoroge (2011); Kabau & Ambani (2013); O'Connell (1960: 452).
95 UN, Transforming Our World: The 2030 Agenda for Sustainable Development. A/RES/70/1, 2015.
96 UNEP Report, Stockholm, 5-16 June 1972, A/CONF.48/14/Rev.1.
97 Adopted on 16 November 1972, entered into force on 17 December 1975.
98 Adopted 2 February 1971, Treaty Series, Vol 996.
99 A/CONF.151/26 (Vol. I). New York: United Nations, 1993.
100 Adopted 10 September 1998, Treaty Series, Vol 2244.
101 A/RES/55/2, adopted on 8 September 2000.
102 Held 2-4 September 2002, A/CONF.199/20.
103 Adopted on 29 January 2000, entered into force on 11 September 2003, Treaty Series Vol 2226.
104 Adopted on 22 May 2001, entered into force on 17 May 2004, Treaty Series Vol 2256.

4.1.1 Convention on Biological Diversity

Kenya is a party to the Convention on Biological Diversity (CBD), which aims to conserve biological diversity and promote the sustainable use of biological resources, including soil. According to Article 3, states have the right to exploit their resources but must ensure activities within their jurisdiction do not harm other states' environments. Therefore, while Kenya has sovereignty over its soil, it is responsible for preventing soil degradation. Article 23 mandates the Conference of the Parties (COP) to review the implementation of the convention, and Article 26 requires countries to report on their progress. Kenya submits reports to the COP and has developed national biodiversity action plans, starting with the first in 2000, to guide implementation through various laws, policies, and strategies.

4.1.2 Strategic Plan for Biodiversity (2011–2020) and Aichi Biodiversity Targets (2020)

In 2010, contracting parties to the CBD adopted a strategic plan for biodiversity, covering 2011-2020, to halt biodiversity loss and enhance benefits to populations. The plan included the Aichi Biodiversity Targets, which serve as indicators of progress. These targets focus on five main goals: socio-economic and institutional changes, reducing pressures on biodiversity, ensuring the flow of benefits to people, and developing conditions for implementation and knowledge-building. When Kenya submitted its Fifth National Report to the CBD, it acknowledged that it had not completed all required measures but committed to reviewing and enacting laws to restore and maintain ecosystems.

4.1.3 United Nations Convention to Combat Desertification

Kenya ratified the UNCCD on 24 June 1997, focusing on preventing soil degradation and restoring degraded land. The convention defines desertification broadly, including soil erosion, loss of vegetation, and the deterioration of soil properties. Under the convention, parties must develop National Action Programmes (NAPs) to address desertification causes and identify practical measures for its combat.

Kenya, with support from UNDP/UNSO, developed its NAP following ratification.[105] The 2002 NAP highlighted constraints such as a sectoral approach, low funding, and inadequate legal and community involvement. Recommendations included

105 Government of Kenya (2002).

enhancing resource mobilisation, integrating NAP into national processes, and improving community participation.

A 2013 UNDP study on the implementation of the CCD in Kenya's drylands identified lessons, such as the importance of improving livelihoods and using indigenous knowledge for land management.[106] Kenya has since implemented programs including the African Initiative for Combating Desertification and promoted drought-resistant tree planting to reduce land degradation. Additionally, Kenya hosted the 15th Session of the Committee for the Review of the Implementation of the UNCCD in 2016, where it launched a land restoration program aimed at restoring significant land areas by 2030.

4.1.4 Land degradation-neutrality

Land Degradation Neutrality (LDN) was defined at the 12th UNCCD Conference of Parties as a state where land resources necessary for ecosystem functions and food security remain stable or improve.[107] LDN encourages measures to reduce, avoid, or reverse land degradation through sustainable land management and land-use planning.[108]

In Kenya, while there is no specific LDN legislation, several laws and policies indirectly support its goals. The Constitution guarantees the right to a clean environment and sustainability, influencing all legal instruments related to land and soil.[109] The Environment Management and Coordination Act (1999) promotes soil conservation and reforestation, aligning with LDN objectives. Other relevant laws include the Agriculture and Food Authority Act (2015) and Community Land Act (2016), which focus on soil conservation and land management.

The National Environment Policy advocates for a National Soil Conservation Policy, while the National Land Use Policy (2017) emphasises regulating land use and conserving ecologically sensitive areas. Additionally, county governments, such as Makueni, have passed laws including the Makueni County Sand Conservation and Utilisation Act (2015) to combat land degradation locally.

While no specific LDN law exists, Kenya's existing legal and policy framework supports the principles of LDN, highlighting the need for stronger policy coherence on soil conservation.

106 UNDP (2013).
107 UNCCD (2016).
108 Gichenje et al. (2019).
109 Constitution of Kenya, Arts 42 & 60.

4.2 Regional policies and instruments

At the regional level, several treaties and instruments address soil conservation and the prevention of land degradation. These initiatives focus on fostering cooperation among countries to combat desertification, promote sustainable land management, and protect soil health.

4.2.1 African Convention on the Conservation of Nature and Natural Resources, 1968

The African Convention on the Conservation of Nature and Natural Resources, signed in 1968 and revised in 2003 and 2017, has been ratified by over 30 countries, including Kenya. Its goals are to promote environmental protection, and sustainable use of natural resources, and coordinate policies for ecologically sound, economically viable, and socially acceptable development. The Convention emphasises the right to a satisfactory environment for development and the duty of states to meet environmental and developmental needs sustainably. It recognises soil as a key natural resource for protection. Article VI specifically calls for measures to prevent land degradation, conserve soil, and promote sustainable farming practices, making soil conservation central to achieving its objectives.

4.2.2 Action Plan of the African Union/New Partnership for Africa's Development Environment Initiative

The Action Plan of the African Union/New Partnership for Africa's Development (NEPAD) Environment Initiative was developed in response to Africa's environmental challenges, following a consultative meeting of environment ministers under the African Ministerial Conference on the Environment (AMCEN). Adopted in Maputo on 12 July 2003, the plan began implementation in 2004. AMCEN's work program, which focuses on combating desertification, land degradation, and drought, is a key part of the initiative, with support from UNEP and other agencies. In Kenya, the implementation of NEPAD was formalised in 2002 through an executive order, and a National Steering Committee was established to guide Kenya's participation.

4.2.3 NEPAD's Initiative for the Resilience and Restoration of African Landscapes

The Initiative for the Resilience and Restoration of African Landscapes, launched by NEPAD in Paris on 6 December 2015, aims to enhance resilience in Africa's landscapes, particularly in drylands and vulnerable areas. It focuses on biodiversity conservation, climate-smart agriculture, rangeland management, and forest and ecosystem conservation. In partnership with the African Forest Landscape Restoration Initiative, it aims to restore 100 million hectares of degraded land by 2030, improving soil fertility, food security, and combating desertification.

In Kenya, while specific programs under the initiative are not confirmed, the Ministry of Environment and Natural Resources is leading a tree planting effort in the Maasai Mau Forest, aiming to plant ten million trees. This program, initiated with three million trees in 2019, focuses on protecting water catchment areas and promoting soil conservation through reforestation.

4.2.4 Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, 1985

The Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, adopted in Nairobi on 21 June 1985, aims to protect threatened species and important natural habitats in East Africa. Article 8 of the Protocol mandates the establishment of protected areas to preserve ecosystems, including those that support endangered, endemic, migratory, and economically important species. Soil and forests, vital for soil conservation, form key ecosystems for these species. While the Protocol does not explicitly mention soil, it indirectly requires its protection by prohibiting activities that degrade habitats, which includes safeguarding soil from degradation.

4.3 National policies

4.3.1 National Environment Policy, 2014

The National Environment Policy outlines measures to enhance ecosystem conservation and the sustainable use of natural resources. It highlights the adverse effects of urban degradation, poor waste management, and industry-related pollution on soil quality. Human activities such as unsustainable land use, poor soil and water management, deforestation, overgrazing, and pollution contribute to environmental degradation in Kenya. The policy proposes several soil conservation measures, including the development of a National Soil Conservation Policy, the promotion of eco and organic

farming to maintain soil fertility, and community involvement in soil conservation efforts. It also emphasises promoting good soil management practices to prevent disasters such as landslides and floods.

4.3.2 National Land Policy, 2009

Kenya's National Land Policy is the country's first land policy, offering guidance on land administration, access, planning, restitution, and governance. It addresses land tenure, compulsory acquisition, and land-use conflicts. The policy emphasises sustainable land-use practices as essential for food security and self-sufficiency, highlighting issues such as soil erosion, population pressure, overstocking, and lack of alternative land uses. It calls for promoting soil conservation through technology, scientific methods, and traditional practices, and aims to control land degradation. The policy also includes environmental assessments, audits, and monitoring mechanisms to manage urban and rural environmental degradation and protect soil quality. Public participation and enforcement, including the 'polluter pays principle,' are also key aspects.

4.3.3 National Land Use Policy, 2017

The National Land Use Policy aims to establish a framework for the sustainable and productive use of land-related resources at national, county, and community levels. It is based on principles of economic productivity, social responsibility, environmental sustainability, and cultural conservation. The policy addresses issues such as soil erosion, land degradation, and desertification, especially in arid and semi-arid regions. It highlights the impacts of poor land-use practices, including soil erosion and environmental degradation, which reduce food production capacity. The policy calls for assessing land resources, conducting soil surveys, and promoting modern farming practices to sustain soil fertility. It also advocates for unified mechanisms for data collection and sharing to manage soils effectively.

4.3.4 National Climate Change Action Plan, 2013

The National Climate Change Action Plan focuses on achieving low-carbon, climate-resilient development while prioritising adaptation. Key adaptation actions that impact soil include increasing forest cover to 10% of the total land area and rehabilitating degraded lands.[110]

110 Government of Kenya (2018b: 37).

4.3.5 National Agricultural Soil Management Policy, 2023

The National Soil Management Policy in Kenya aims to address key challenges affecting soil productivity, sustainability, and the broader agricultural sector. The policy's overall goal is to contribute to economically viable, environmentally sustainable, and socially acceptable development opportunities that improve food security, reduce poverty, and enhance agricultural production through better soil management. The policy's specific objectives focus on:

Sustainable agricultural soil and water conservation: Addressing soil erosion and land degradation caused by unsustainable practices such as intensive cultivation on slopes, deforestation, overgrazing, and improper farming methods. There is an emphasis on promoting organic farming and bio-fertilisers, though the lack of regulation for bio-fertilisers and weak policy enforcement for organic practices remain challenges.

Soil management and environmental protection: Acknowledging that poor soil management practices contribute to environmental degradation, including soil erosion, landslides, and loss of soil fertility. There is a call for better regulations and standards for soil contaminants and for addressing the increasing environmental pollution from industrial activities.

Technology development, dissemination, and utilisation: The policy emphasises the importance of research and innovation in soil management, particularly through improving extension services to better serve Kenya's small-scale farmers.

Fertiliser development and investment: Highlighting the need to regulate and invest in fertiliser use, with concerns over the quality of fertilisers in the market, lack of adequate soil testing facilities, and insufficient government funding for soil-related investments.

Cross-cutting issues: The policy also addresses social factors such as gender inequalities, the impacts of diseases such as HIV/AIDS and COVID-19 on agricultural productivity, and the potential conflicts arising from climate change and the competition for resources such as land and water.

The policy acknowledges that soil degradation in Kenya is linked to factors including population pressure, poor land-use practices, and climatic changes, and it proposes comprehensive measures to restore and rehabilitate soils, promote agroforestry, and enhance soil conservation through both traditional and modern techniques. However, issues such as weak policy enforcement, lack of sufficient investment, and inadequate soil testing infrastructure need urgent attention for the policy to be fully effective.

4.3.6 The Livestock Policy, 2020

The Livestock Policy aligns with the Constitution, Kenya Vision 2030, and agriculture strategies, recognising that over 80% of Kenya's land is arid and semi-arid (ASAL),

where livestock is the main livelihood. It also highlights livestock's role in family income, food security, and foreign exchange earnings through exports. The policy focuses on commercialising livestock development while addressing environmental impacts, including land, water, and wildlife interactions. It aims to improve livestock productivity in ASALs and tackle overgrazing, invasive plants, pests, declining soil health, climate change, land use competition, and inadequate forage supply.

4.4 National Laws

4.4.1 The Constitution of Kenya, 2010

Kenya's 2010 Constitution significantly transformed environmental conservation and management, emphasising sustainable development (Article 10(2)(d)) and access to environmental justice. It recognises environmental rights as fundamental human rights (Article 42), granting citizens the right to a healthy environment, including soil. If a person alleges that a right to a clean and healthy environment has been, is being or is likely to be denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to these issues (Article 70(1)).

The Constitution mandates the state to provide information on environmental matters (Article 35(1)(9)(a) and (b)) and establishes the ELC to handle soil conservation disputes (Article 162(2)(b)). It also outlines principles for land management and environmental protection, including sustainable use and conservation of natural resources (Article 60). While soil conservation is a shared responsibility between national and county governments, devolution has been slow, and challenges such as unclear roles and insufficient resources hinder effective implementation.[111] Cooperation between the two levels of government is crucial for sustainable soil governance.[112]

4.4.2 Environmental Management and Coordination Act, 1999 (as amended)

The EMCA is Kenya's primary environmental law, establishing the legal and institutional framework for environmental management. It defines "environment" broadly, including both natural and built environments, covering land, water, climate, and biological factors (Section 2). Section 5 of EMCA empowers the Cabinet Secretary for Environment to formulate policies and set priorities for environmental protection, including soil management.

111 See *Johnson Kamau Njuguna v Director of Public Prosecutions* [2018] eKLR; Mulinge et al. (2016).

112 See *Council of Governors v Senate* [2015] eKLR.

EMCA establishes NEMA, which oversees environmental coordination and supervises the implementation of environmental policies (Section 7 read with Section 9(1)). NEMA's responsibilities include coordinating soil protection activities, conducting research, advising on land-use planning, monitoring resource use, enforcing environmental standards, and raising public awareness. Through these functions, NEMA can address soil protection by gathering data on soil conditions, developing educational programs, and promoting sustainable soil management practices.

4.4.2.1 National Environment Trust Fund (NETFUND)

The National Environment Trust Fund, established under Section 24 of EMCA (1999), is managed by a board of trustees per a trust deed. The fund's purpose is to support research, capacity-building, environmental awards, publications, scholarships, and grants related to environmental management. As such, the fund can be used to support research and initiatives focused on soil protection.

4.4.2.2 National Environment Restoration Fund

The 1999 EMCA established the National Environment Restoration Fund (Section 25(1)), which is managed by NEMA through the director-general (Section 25(3)). The fund is primarily designed to address environmental degradation, including situations where the responsible party cannot be identified or where exceptional circumstances require the authority's intervention. It is financed through fees determined by NEMA, contributions from industries, and donations from project proponents. The fund can be used to mitigate soil degradation. However, administrative procedures for soil rehabilitation and restoration need to be developed to ensure the effective use of the fund for this purpose.

4.4.2.3 Deposit bonds

Under Section 28 of the EMCA, NEMA is required to maintain a register of activities, industrial plants, and undertakings that are likely to have significant adverse effects on the environment if not operated following good environmental practices. Based on the recommendations of the cabinet secretary in charge of environment and natural resources, the cabinet secretary responsible for finance may mandate operators in these high-risk sectors to pay deposit bonds as security for adherence to good environmental practices.

These deposit bonds are refundable if the operator maintains good environmental practices for a period not exceeding six months, as determined by NEMA. If the operator fails to comply, the bond may be confiscated after an opportunity for the operator to be heard. In severe cases, the operator's license may be revoked if they are found to be a habitual offender.

The proceeds from these deposit bonds are directed into the restoration fund and are considered part of the fund until refunded. Any interest generated from the deposit bonds is for the benefit of NEMA. This mechanism provides a financial incentive for operators to follow good environmental practices and helps fund the restoration of environmental damage. This could be relevant to soil degradation mitigation if industrial activities are contributing to soil harm.

4.4.2.4 County environment committees

Under the EMCA, County Environment Committees (CECs) play a vital role in managing the environment at the county level (Section 30). These committees are established by the governor through a Gazette notice and are chaired by the executive committee member responsible for environmental matters within the county. The CECs include representatives from various sectors such as ministries, farmers or pastoralists, the business community, and public benefit organisations involved in environmental management.

The CECs are responsible for overseeing the management of the environment within the county and are tasked with the development of county strategic environmental action plans every five years. The committees also have the authority to take on additional functions, as prescribed by EMCA or as delegated by the governor through a Gazette notice. This could include tasks related to soil protection and management, particularly if soil degradation is an environmental concern within the county.

The inclusion of soil protection in the committee's mandate is possible, as CECs are responsible for implementing the environmental policies within their jurisdiction. Their role in developing action plans and coordinating with various stakeholders allows them to address specific environmental challenges, including soil degradation, and to promote sustainable soil management practices at the county level. This ensures that local issues are addressed effectively and in line with national environmental policies.

4.4.2.5 National Environment Complaints Committee (NECC)

The National Environment Complaints Commission (NECC), established under Section 31 of the EMCA, 1999, investigates allegations of environmental harm, including soil degradation. Formerly the Public Complaints Committee, it was renamed in the EMCA (Amendment) No. 5 of 2015. The NECC plays a key role in assessing the environment and facilitating alternative dispute resolution. It makes recommendations to the Cabinet Secretary and contributes to environmental policy development. The commission can also investigate environmental degradation cases and take legal action, including public interest litigation, against those responsible for soil degradation.

4.4.2.6 National Environment Action Plans

The authority must formulate the National Environmental Action Plan every six years through a participatory process and submit it for approval by the Cabinet Secretary. Once approved, the plan is sent to the National Land Commission and the Ministry responsible for land and published in the Gazette. NEMA reviews the plan every three years. Once adopted by the National Assembly, the plan becomes binding on all government bodies. The goal of the plan is to coordinate environmental policies and actions across national and county governments, promoting consistency, protecting the environment, and preventing actions that could harm economic or health interests. Soil protection plans could be incorporated into the National Environmental Action Plans.

4.4.2.7 County Environment Action Plans

Each county environment committee is required to develop a County Environmental Action Plan every five years through a participatory process, which is then adopted by the County Assembly (Section 40). When preparing the plan, the committee must consider other county plans to ensure consistency. After adoption, the plan is submitted to the Cabinet Secretary for incorporation into the National Environment Action Plan. The plan must address issues from the National Environment Action Plan relevant to the county. NEMA is tasked with reviewing county plans and recommending their incorporation into the national plan or suggesting necessary changes. The Cabinet Secretary, based on NEMA's recommendations, may issue guidelines for preparing environmental action plans, including soil planning, ecological limits, soil zoning, and soil classification.

4.4.2.8 Monitoring compliance with environmental plans

NEMA is responsible for monitoring compliance with national and county environmental action plans (Section 41). It may take necessary steps or make inquiries to determine if the plans are being followed. If NEMA finds noncompliance, it will issue a written notice to the concerned body, specifying required corrective actions. The body must respond within 30 days, detailing objections or proposed actions. NEMA will then issue a final notice within 30 days, either confirming, amending, or cancelling the notice, or specifying further actions and deadlines. NEMA is also required to keep a record of all environmental action plans, ensuring they are available for public inspection.

4.4.2.9 Protection and conservation of the environment

Part V of EMCA addresses the conservation and management of environmental resources, including rivers, lakes, wetlands, forests, and mountainous areas. Section 44 mandates NEMA, in consultation with relevant agencies, to develop regulations for the sustainable use of hills, mountain areas, and forests. These regulations focus on protecting water catchment areas, preventing soil erosion, and regulating human settlement.

Section 45(1) requires county environment committees to identify hilly and mountainous areas at risk of degradation, such as those prone to soil erosion or deforestation. These areas must be targeted for afforestation or reforestation. County committees encourage local communities to engage in tree planting and vegetation restoration (Section 46). Landholders, including those with leasehold or customary tenure, must implement the committee's measures.

Section 47 obligates NEMA, in consultation with relevant agencies, to issue guidelines for the sustainable use of hills, mountain areas, and forests. These guidelines cover appropriate farming methods, soil erosion control, disaster preparedness for landslides, protection of water catchments, and more. County environment committees are responsible for ensuring the implementation of these measures. Violators of these regulations face penalties.

4.4.2.10 Integrated environmental impact assessment

Section 57A of EMCA mandates that all policies, plans, and programs be subjected to strategic environmental assessments (SEAs). SEAs are a formal process to analyse the environmental impacts of strategic initiatives at national, county, and regional levels (Section 2). The authority determines which plans should undergo SEA based on their

potential environmental effects. The entities preparing these plans bear the costs of the assessments, which must be submitted for approval to the authority, in consultation with relevant stakeholders.

Before starting projects listed in the Second Schedule of the Act, proponents must submit a project report to NEMA and may need to conduct an EIA, including soil impact assessments (Section 58(1)). NEMA regulates integrated environmental impact assessments and environmental audits, and the cabinet secretary, in consultation with NEMA, is tasked with making regulations for these practices and accrediting experts.

False or misleading reports are punishable by up to three years of imprisonment, fines, or both, and may lead to license revocation. NEMA can cancel, suspend, or revoke licenses for violations, providing written reasons for the action.

To improve public access to information, NEMA must publish notices of proposed projects in newspapers, on the radio, and on its website, including summaries of EIA reports (Section 59(1)). This allows the public to access soil-related information and participate in decision-making processes.

4.4.2.11 Environmental monitoring

In consultation with relevant agencies, the authority monitors environmental changes and assesses their impacts and the effects of industries, projects, or activities (Section 69(1)). Environmental inspectors may enter the premises to verify compliance with EIA Study Reports (Section 68(2)). Project operators must keep records, submit annual compliance reports, mitigate unforeseen adverse effects, and submit environmental audit reports to the authority as required (Section 68(3-4)).

4.4.2.12 Environmental quality standards

The cabinet secretary for environment, on the authority's recommendation, is empowered to set standards for water and air quality (Sections 71 & 78), waste classification and management (Section 85), hazardous waste (Section 91), pesticide residues (Section 94), noise, vibration (Section 101), and radiation levels (Section 104). The secretary must also identify hazardous materials and processes, issue guidelines for their management, and regulate waste handling, storage, transportation, and disposal.

Disposing of waste or hazardous substances in a way that causes pollution or harm is an offence (Section 87(1)). It is an offence for any person to discharge a hazardous substance, chemical, oil or mixture containing oil into any waters or other areas of the environment (Section 93(2)). It is an offence for any person to discharge or dispose of any wastes, whether generated within or outside Kenya, in such a manner as to cause pollution to the environment or ill health to any person (Section 87(1)). Offenders must

cover removal and restoration costs and compensate third parties as determined by the court (Section 93(3)).

For pesticides and toxic substances, the cabinet secretary establishes standards for their lifecycle, from import to disposal, monitors their environmental impact, maintains standards in laboratories, and enforces regulations for safe storage, packaging, and transportation.

4.4.2.13 Environmental restoration orders

The authority may issue an environmental restoration order requiring a person to restore the environment to its prior state, prevent any action likely to harm the environment, compensate individuals whose environment or livelihood was harmed, and cover the costs incurred by authorised entities in restoring the environment (Section 108). The order may also mandate actions such as preventing pollution or environmental hazards, restoring land through soil replacement, replanting flora, or preserving geological, archaeological, or historical features, stopping actions contributing to pollution or hazards, removing or mitigating harm to land, the environment, or local amenities, preventing damage to land, aquifers, flora, fauna, or surrounding areas, properly disposing of waste or refuse deposited on specified land or sea and paying any compensation specified in the order.

4.4.2.14 Environmental easements and environmental conservation orders

A court may grant an environmental easement or conservation order on burdened land to preserve flora and fauna, maintain water quality and flow in dams, lakes, rivers, or aquifers, protect geological, ecological, archaeological, or historical features, safeguard scenic views and open spaces, allow defined paths for walking, preserve natural land contours, restrict mining or agricultural activities, establish works to prevent environmental harm or create and maintain wildlife migration corridors (Section 112).

4.4.2.15 Integrated National Land Use Guidelines

NEMA, under Section 9(2) of EMCA, developed the Integrated National Land Use Guidelines to address various environmental concerns.[113] For lakes, a 30 m buffer zone is proposed to minimise soil erosion, while coastal guidelines protect near-shore coral reefs from harmful activities. On agricultural land, the guidelines advocate mapping

113 National Environment Management Authority (2011).

soil capability profiles for sustainable farming, with crop production aligned to agroecological zones, soil traits, and recommended practices. Contour farming is advised on slopes up to 12%; for slopes 12%-55%, soil conservation measures are mandatory, and above 55%, perennial crops such as tea and bananas are recommended. Soil protection strategies include contour ploughing, crop rotation, manure application, crop residue retention, and terracing.

The guidelines address red soil harvesting, emphasising the rehabilitation of degraded sites, banning loose hanging materials near excavations, and restricting activities in road reserves, residential zones, and sensitive areas. Vertical quarry faces exceeding 2.5 m are prohibited. In flood-prone areas, afforestation, tree planting, and conservation in catchments and watercourses are recommended. For landslide-prone areas, intensified soil and water conservation on settled lands and slope-based infrastructure planning are emphasised.

4.4.2.16 Assessment of the effectiveness of the Environmental Management and Co-ordination Act

NEMA is responsible for studying and examining land-use patterns to assess their impact on natural resources, including soil, and making recommendations for land planning in Kenya.[114] This function necessitates coordination with other government entities such as the Ministry of Lands and Physical Planning, the National Land Commission, and county governments.[115] However, the lack of institutional coordination and harmony among statutes establishing these bodies poses significant challenges to effective land-use management, as highlighted in the National Land Use Policy. The 2017 policy aims to improve institutional coordination to address issues such as agricultural area encroachment, urban sprawl, and environmental degradation.

Inadequate resource mapping further limits the effectiveness of environmental conservation, particularly in soil management. Effective soil conservation requires detailed information on vulnerable lands, watersheds, vegetation, topography, and drainage courses. However, there has been insufficient focus on soils compared to other resources such as water and forests.[116]

EIAs are crucial tools for balancing development and conservation.[117] However, the effectiveness of EIAs is often compromised. Many capital-intensive projects proceed without EIAs or with assessments that fail to meet legal standards, as illustrated in *Cortec Mining Kenya Limited v Cabinet Secretary Ministry of Mining* [2015]

114 Environment Management and Coordination Act, 1999, Sec 9.
115 Government of Kenya, National Land Use Policy, Sessional Paper, No. 1 of 2017, 20.
116 Government of Kenya, Royal Netherlands Government & UNEP (1997).
117 Environment Management and Coordination Act, 1999, Sec 57.

eKLR.[118] Such lapses result in unmitigated environmental harm, particularly to soil and water resources.

EMCA also addresses water quality for agriculture, recognising the link between poor water quality and soil degradation.[119] The Environmental Management and Co-ordination Quality Regulations, 2006, prohibit using wastewater for irrigation unless it meets the standards in the Eighth Schedule. However, studies, such as one on the Mwea Irrigation Scheme, reveal widespread use of toxic wastewater, degrading soil quality and reducing productivity.[120]

The law prohibits hazardous waste disposal without a valid permit, defining hazardous waste as substances likely to harm human health or the environment.[121] However, enforcement is weak, and even government entities mismanage waste and dumpsites, exacerbating environmental degradation.[122] Citizens have often resorted to legal action to compel the government to manage waste properly.[123]

Additionally, regulations mandate the cabinet secretary, with NEMA's advice, to establish standards for pesticides and toxic substances.[124] Despite measures to combat illicit chemical and fertiliser trade, substandard products remain widespread, adversely affecting the agricultural sector. This issue, alongside other challenges, continues to hinder effective environmental and soil management.

4.4.3 Forest Conservation and Management Act, 2016

The Forest Conservation and Management Act 34 of 2016 aims to ensure the sustainable management, conservation, and rational utilisation of forest resources for Kenya's socio-economic development and related purposes (Section 2). The Act defines "forest produce" to include resources such as limestone, murram, and soil. Section 7 establishes the Kenya Forest Service (KFS), tasked with conserving, protecting, and managing all public forests, preparing and implementing management plans for public forests, and assisting in drafting plans for community or private forests when requested. KFS is also responsible for reviewing applications for licenses or permits related to forest resources, establishing and implementing benefit-sharing arrangements, building forestry management capacity for county governments, and developing programs

118 See also *Save Lamu v National Environmental Management Authority (NEMA)* [2019] eKLR, where the National Environment Tribunal nullified an EIA licence because the due process of undertaking the EIA was not followed.
119 Environment Management and Coordination Act, 1999, Sec 71.
120 Nyabonyi (2016).
121 Environment Management and Coordination Act, 1999, Sec 91.
122 Wasilwa & Nanjala (2019).
123 See *African Centre for Rights and Governance (ACRAG) v Municipal Council of Naivasha* [2017] eKLR.
124 Environment Management and Coordination Act, 1999, Sec 94.

for tourism, recreation, and ceremonial uses in public forests. Additionally, KFS promotes forestry education and training, collaborates with stakeholders to identify research needs and apply findings, and manages water catchment areas to support soil and water conservation, carbon sequestration, and other environmental services. All indigenous forests and woodlands are managed sustainably to conserve water, soil, and biodiversity and to protect riparian zones and shorelines (Section 42(1)(a) and (b)). This comprehensive approach aims to enhance ecosystem resilience, support environmental conservation, and provide socio-economic benefits tied to sustainable forest resource use.

4.4.3.1 Quarrying

The KFS is required to grant consent for quarrying operations in forest areas only after an independent EIA or audit has been conducted (Section 46(1)(c)). Following this, the cabinet secretary, based on the service's recommendation and in consultation with the cabinet secretary for the environment and other relevant government agencies, will issue rules to regulate quarrying activities in forest areas. If the quarrying activity is likely to deplete forest cover, the licensing conditions will mandate the licensee to carry out compulsory restoration and re-vegetation immediately after the activity's completion (Section 46(4)). This re-vegetation process will be carried out in consultation with the KFS, which will determine the appropriate seeds and seedlings to be used (Section 46(5)). This approach ensures that quarrying activities in forest areas are carefully regulated to mitigate environmental impacts and support the restoration of forest ecosystems.

4.4.3.2 Incentives for increasing forest and tree cover

The cabinet secretary for the National Treasury has the authority to propose tax and fiscal incentives aimed at boosting investments in forestland use and resource utilisation, thereby, promoting forest conservation and preventing degradation (Section 54(1)). These incentives may include waivers on customs and excise duties for imported capital goods, tax rebates for forest industries investing in machinery for better resource utilisation, exemptions from land rates and other charges for private forests (Section 54(2)). Additionally, income and other tax deductions may be offered to landowners who establish forest conservation easements. The cabinet secretary is also responsible for planning and executing programs for national tree-planting week and the International Day of Forests (Section 55).

Under Section 64 of the Act, certain activities are prohibited in public or provisional forests unless authorised by a license, permit, or management agreement. These

prohibited activities include felling, cutting, taking, burning, injuring, or removing any forest produce; smoking or starting fires where prohibited; allowing livestock to graze; clearing or cultivating land; constructing roads or paths; or setting fire to any forest produce. Violating these restrictions is an offence, punishable by a fine of up to 100,000 shillings, imprisonment for up to six months, or both. This legal framework is designed to protect forests and ensure sustainable management and conservation.

4.4.4 Water Act, 2016

The Water Act 43 of 2016 provides a legal framework for the regulation, management, and development of water resources, water and sewerage services, and related activities. It emphasises the importance of water resource management, which includes the conservation, protection, development, and utilisation of water resources, as well as soil and water conservation (Section 2). According to the Act, no person is allowed to provide water services without a licence issued by the Regulatory Board (Section 85(1)). The application for such a licence must include supporting documents as required by the Board.

A licensee is authorised to enter into agreements with other parties for activities related to the management and protection of water resources. This includes protecting catchment areas, land drainage, soil conservation measures, vegetation control, and ensuring the purity and quantity of the water being extracted (Section 104(1)). These agreements are made to ensure the licensee can effectively manage the water resources under their control while maintaining environmental integrity.

4.4.5 Climate Change Act, 2016

Kenya has established a robust legal and policy framework to address climate change through several key instruments, including the National Climate Change Action Plan (2013), the National Climate Change Framework Policy (2016), and the Climate Change Act 11 of 2016. These instruments are designed to reduce the causes of climate change, build resilience, enable climate financing, manage knowledge, develop capacity, and address technological needs, alongside monitoring and reporting mechanisms.

The Climate Change Act specifically applies to the development, management, and regulation of mechanisms that promote climate change resilience and low-carbon development across all sectors of the economy (Section 2). It is implemented by both the national and county governments and aims to mainstream climate change responses into development planning and decision-making. The Act focuses on building resilience, enhancing adaptive capacity to climate impacts, and incorporating climate change disaster risk reduction into the strategies of both public and private entities.

Additionally, it emphasises gender equity and intergenerational fairness in climate change responses.

The Act also establishes the Climate Change Council, which serves as the central body for coordinating climate change efforts across the country. The council's responsibilities include ensuring that climate change is integrated into the operations of national and county governments, approving and overseeing the implementation of the National Climate Change Action Plan, and promoting climate action in various sectors (Section 6). Additionally, the Climate Change Directorate provides analytical support to ministries, agencies, and county governments in their climate change efforts (Section 9).

Kenya has also emerged as a leader in sustainable energy development, highlighted by its hosting of Africa's largest wind power plant.[125] The country's commitment to sustainability extends to its financial sector, with the Capital Markets Authority approving Kenya's first green bond aimed at funding environmentally friendly student accommodation.[126] Furthermore, private lending institutions, such as F3 Life, are offering farmers affordable green loans.[127] These loans are linked to soil conservation practices, with the interest rates determined by the quality of the farmer's conservation efforts, thus, incentivising soil and land preservation through financial support. This approach represents a transformative integration of climate resilience, sustainable development, and financial innovation.

4.4.6 Land laws

In Kenya, land tenure systems play a significant role in shaping land-use practices and, consequently, the quality of soils. The Constitution classifies land into three main categories: public land, community land, and private land (Article 61(2)). Public land includes government-owned land such as alienated government land used by state organs, government forests, game reserves, national parks, water catchment areas, roads, rivers, lakes, and other protected areas (Article 62(1)). It also includes minerals, mineral oils, and land where no individual or community ownership can be established. Public land is held in trust for the people by county or national governments and administered by the National Land Commission (Article 62(3)). However, insecurity of tenure often leads to the invasion and over-exploitation of public land, particularly forestland, contributing to soil degradation.

125 Salaudeen (2019).

126 See https://www.cma.or.ke/index.php?option=com_content&view=article&id=591:press-release-cma-approves-kenya-s-first-green-bond&catid=12:press-center&Itemid=207, accessed 6 November 2019.

127 See http://farmbizafrica.com/profit-boosters/1434-farm-loan-pegs-interest-on-soil-conservation, accessed 3 November 2019.

Community land is held by communities based on ethnicity, culture, or shared interests, and includes land registered in the name of group representatives, land transferred to a community by law, ancestral lands, community forests, grazing areas, shrines, and land held as trust land by county governments (Article 63(1-2)). If unregistered, community land is held in trust by county governments on behalf of the communities (Article 63(3)). Community land can be prone to misuse, especially when tenure security is unclear, leading to unsustainable land-use practices that degrade soil quality.

Private land consists of land held under freehold or leasehold tenure and includes land registered in the name of any person or entity (Article 64). Private landholders have more secure tenure rights, which can encourage sustainable land-use practices. However, soil degradation can still occur if landowners prioritise short-term economic gains over long-term land and soil conservation. The management and use of these types of land depend heavily on the legal and policy framework governing land tenure, with a significant impact on soil conservation and degradation. For example, the insecurity of tenure on public land often leads to illegal exploitation of forest resources, resulting in soil erosion and loss of fertility. Similarly, community land, if not well-managed or registered, can suffer from overuse and mismanagement, while private land is more likely to be protected through individual investment in soil conservation practices, depending on the landowner's priorities.

4.4.6.1 Land Act, 2012

The Land Act 6 of 2012 is designed to give effect to Article 68 of the Kenyan Constitution by consolidating and rationalising land laws to promote sustainable administration and management of land and land-based resources. Article 68 grants Parliament the authority to revise, consolidate, and rationalise existing land laws, revise sectoral land-use laws based on constitutional principles, set minimum and maximum landholding acreages for private land, regulate land conversion, and ensure the protection, conservation, and access to public land. The Act empowers the Cabinet Secretary to develop land policies upon the recommendation of the National Land Commission, facilitate the implementation of land reforms, coordinate land management, and oversee the National Spatial Data Infrastructure (Section 6). Additionally, the Cabinet Secretary provides policy direction for all land classes in collaboration with the Commission. The National Land Commission plays a key role in managing public land on behalf of the national and county governments (Section 8). It evaluates public land parcels using land capability classifications, resource mapping, and land-use potential and may designate land for specific uses under defined conditions. The Commission also sets management guidelines for public land used by various public agencies,

statutory bodies, and state corporations, outlining priorities and operational principles to ensure effective resource management (Section 10).

4.4.6.1.1 Development plans

The Land Act grants the National Land Commission the authority to reserve public land for the public interest upon the request of the national or county government, through an order in the Gazette (Section 15). A management body, either on its own or at the request of the Commission, must submit a development, management, and use plan for the reserved public land to the Commission for approval (Section 17(1)). Before submitting this plan, the management body is required to consider any conservation, environmental, or heritage issues that may be relevant to the land's development, management, or use (Section 17(2)). The body must also include a statement confirming that these issues have been considered in the plan, submit an environmental impact assessment as per existing environmental law, and ensure the plan aligns with constitutional values and principles.

Once the Commission approves the plan and notifies the management body, the body is authorised to develop, manage, and use the land following the approved plan, which may vary over time (Section 17(3)). However, if the management body fails to adhere to the Commission's guidelines or directions, or if it does not submit a plan in compliance with the Commission's request, the Commission can revoke the management order through an order in the Gazette (Section 18(1-2)). Additionally, if the Commission determines that revoking the management order serves the public interest, it may also issue such a revocation order. The preparation and implementation of the development plan must comply with physical planning regulations and any other relevant laws (Section 18(3)).

4.4.6.1.2 Conservation of land-based natural resources

The National Land Commission is empowered to create rules and regulations to ensure the sustainable conservation of land-based natural resources. These rules may include measures to protect critical ecosystems and habitats, provide incentives for individuals and communities to engage in income-generating conservation programmes, and facilitate the access, use, and co-management of forests, water, and other resources by communities with customary rights. Additionally, the Commission may establish procedures for registering natural resources in an appropriate register, define stakeholder involvement in managing and utilising these resources, and implement measures to ensure benefit-sharing with affected communities (Section 19).

Section 135 of the Land Act establishes the Land Settlement Fund, managed by the Land Settlement Fund Board of Trustees. The board is responsible for providing access to land for various purposes, including conservation. The Fund is financed through various sources, including appropriations from Parliament, contributions from bilateral or multilateral donors, gifts, grants, donations, and endowments. It also receives money from rates, charges, or fees levied by the board, payments made by beneficiaries of settlement schemes, and any other sums allocated to the board through legislation or other laws.

4.4.6.2 Land Regulations

The Land Regulations of 2017 govern the management and administration of public, private, and community land in Kenya. Applications for the subdivision, amalgamation, partition, and re-parcellation of freehold land must be submitted to the county government (Regulation 16(1)). The county government reviews these applications to determine their viability and consults with relevant authorities, including the national director of Surveys, the national director of Physical Planning, the land administration officer from the national government, and the Land Control Board, where applicable (Regulation 16(2)).

Similarly, applications for the subdivision, amalgamation, partition, and re-parcellation of leasehold land are also submitted to the county government (Regulation 17(1)). In this case, the county government seeks representations from the same authorities before approving (Regulation 17(2)).

For building plans on leasehold land, the application is submitted to the relevant county government (Regulation 20(1)). Once the county government approves the building plans or other developments on leasehold land, it communicates the approval to the cabinet secretary and the National Land Commission to confirm that the conditions of the lease have been met (Regulation 20(2)).

4.4.6.3 Guidelines for management of public land held by public agencies, statutory bodies, and state corporations

Public agencies, statutory bodies, and state bodies entrusted with the control, care, and management of reserved land under Section 16 of the Land Act are required to carry out their responsibilities in line with the guidelines provided in the First Schedule of the Land Regulations (Regulation 5). These guidelines mandate that the institutions prepare long-term land-use and management plans for the reserved land and submit these plans to the National Land Commission for deposit. This process ensures that the

management of reserved land aligns with national land-use objectives and regulatory frameworks.

4.4.6.4 Community Land Act, 2016

The Community Land Act 27 of 2016 outlines important provisions for the recognition, protection, and registration of community land rights, as well as the management and administration of community land. It emphasises the role of county governments in managing unregistered community land. Key aspects of the Act include the establishment of community land management committees, which are responsible for the day-to-day management of community land, including the coordination of community land-use plans with relevant authorities (Section 15(4)). The committees also promote cooperation and participation among community members in managing the land and must ensure that rules and regulations governing the community are ratified by the community assembly.

A registered community is required to have a community assembly made up of adult members, with decision-making requiring a quorum of no less than two-thirds of the assembly (Section 15(1)). The assembly elects between seven and 15 members to form the community land management committee (Section 15(3)).

The provisions in the Community Land Act present a valuable opportunity to embed sustainable soil management practices through the active involvement of community members in the decision-making process, the creation of land-use plans, and the implementation of rules that promote the responsible management of natural resources, including soil. By ensuring that the community is involved in the management of its land, the Act fosters cooperation that can lead to better soil conservation and land-use practices, contributing to long-term environmental sustainability.

4.4.6.4.1 Land use and development planning of community land

A registered community has the right to submit a plan for the development, management, and use of its community land to the county government, either on its initiative or at the request of the county government (Section 19(1)). Before submitting such a plan, the community must consider key factors such as conservation, environmental, or heritage issues related to the land (Section 19(2)). The community must include a statement in the plan confirming that these issues have been considered and should also consider an environmental impact assessment in line with existing environmental laws. The plan must comply with constitutional values and principles and be ratified by the members of the registered community. The community must also ensure that the plan aligns with any relevant physical development plan.

Once the community submits the plan to the county government and receives approval, the community is required to manage and use the land according to the approved plan, or any subsequent amendments (Section 19(3)). The county government, in considering the plan, must adhere to development planning laws (Section 19(4)). Additionally, upon request from the commission, the county government must provide records of development plans submitted to it following this provision (Section 19(5)). This process ensures that community land is developed and managed in a way that is legally sound, environmentally responsible, and aligned with the community's values and the broader regulatory framework.

4.4.6.4.2 Conservation and management of resources in community land

For sustainable conservation of land-based natural resources, each registered community must comply with relevant laws, policies, and standards (Section 20(1)). Communities should implement measures to protect ecosystems, offer incentives for natural resource conservation, facilitate access and co-management of resources including forests and water for communities with customary rights, and establish procedures for resource registration and stakeholder involvement in resource management (Section 20(2-3)).

4.4.6.4.3 Grazing rights

A registered community must consider the customs and practices of pastoral communities relating to land, provided they align with the Act or applicable law (Section 28(1)). Community land in pastoral areas must be available for grazing, subject to conditions such as the type and number of livestock, designated grazing sections, rotation plans, and the community's right to use the land as per the Act (Section 28(2)). This is vital to prevent overgrazing, a key cause of soil degradation. The community may grant grazing rights to non-members under specific conditions but can withdraw these rights in cases such as drought or failure to comply with regulations (Section 28(3-5)). Additionally, no one may build, cultivate, or obstruct access to watering points on grazing land without the community's written approval (Section 28(6)).

4.4.6.4.4 Land use rights on community land

A registered community may designate special purpose areas for uses such as farming, settlement, community conservation, access and rights of way, cultural and religious sites, urban development, or any other purpose deemed necessary by the community,

county government, or national government for the public interest (Section 29(1)). These areas must be used exclusively for their designated purposes (Section 29(2)).

4.4.6.4.5 Natural resources on community land

Natural resources on community land must be used and managed sustainably and productively for the benefit of the entire community, including future generations (Section 35). This should be done with transparency, accountability, and equitable sharing of the resulting benefits.

4.4.6.4.6 Rules and by-laws

A registered community may create rules or by-laws to regulate the management and administration of its land (Section 37). These may cover the regulation of investments, lease terms for investment purposes, land conservation and rehabilitation, land use and physical planning, and other relevant matters.

4.4.6.4.7 Regulation of community land-use planning

The state has the authority to regulate land use, or any interest or right over land, for purposes such as defence, public safety, public order, public morality, public health, and land-use planning (Section 38(1)). The management of community land is also subject to national and county government laws and policies concerning fishing, hunting, gathering, wildlife protection, water conservation, hydraulic engineering, forestry, environmental protection, energy policy, and the exploitation of minerals and natural resources (Section 38(2)).

4.4.6.5 Land Control Act, 2012

The Land Control Act, Cap 302, governs the development, use, and subdivision of agricultural land. It establishes the Land Control Board for each land control area, which must grant consent for transactions such as the sale, transfer, lease, mortgage, exchange, partition, or other dealings with agricultural land (Section 6(1)). It also covers the division of agricultural land into parcels, except when the area is less than 20 acres and subject to specific planning regulations, as well as the transfer of shares in companies or cooperatives owning agricultural land.

When deciding whether to grant consent, the board must consider the economic development of the land and the maintenance or improvement of good husbandry practices (Section 9(1)). Consent is generally refused if the terms of the transaction are unfair or disadvantageous to one party, or if the division of land would reduce its productivity.

Although the requirement for consent can support soil conservation, land control boards have often been ineffective due to corruption, with some cases where the principle of granting consent has been based on the highest bidder, leading to the disbanding of boards by the government.[128]

4.4.6.6 Physical and Land Use Planning Act, 2019

The Physical and Land Use Planning Act, which repealed the Physical Planning Act of 1996, aligns with the Constitution of Kenya, 2010 (Article 1), establishing a framework for sustainable land use and planning at both national and county levels. The Act aims to regulate physical and land-use development through a set of principles, procedures, and standards, with a focus on equitable and sustainable land management (Section 3). It establishes key bodies such as the National Physical and Land Use Planning Consultative Forum (Section 6) and the National Land Commission (Section 9), which oversee land-use planning and provide a forum for consultations on national plans (Section 10).

The Act requires national and county authorities to ensure public participation in planning, following the devolution principles of increasing community engagement in decision-making (Sections 9-10). The planning process also emphasises the importance of integrating economic, social, and environmental needs, including sustainable soil management.

One of the major goals of the Act is to ensure the preparation of long-term national physical and land-use plans, which may guide soil conservation and protection efforts (Section 21). The plans must include spatial analysis and environmental data such as soil maps and other relevant environmental information (Section 24). The planning system incorporates the development control process, ensuring that land use complies with the Constitution (Article 60), focusing on equitable, efficient, and sustainable management.

Despite these advancements, challenges remain. Past planning laws faced issues such as corruption, weak institutions, and ineffective development control mechanisms.[129] Moreover, the rapid conversion of agricultural lands to urban developments has led to conflicts, undermining sustainable land management.[130] While the 2019 Act

128 Maina (2016).
129 Mativo (2015: 37).
130 Ndegwa (2001).

improves on previous laws by addressing many of these issues, the duplication of institutions at both county and national levels could continue to hamper effective soil governance and land-use planning.

For soil conservation and protection, effective enforcement of the Act's provisions and addressing governance inefficiencies are crucial to ensuring long-term environmental sustainability in Kenya.

4.4.7 Agriculture, Fisheries, and Food Authority Act, 2013

The Agricultural, Fisheries and Food Authority Act 13 of 2013 establishes the Agriculture and Food Authority (AFA), which regulates and promotes best practices in the agricultural sector, excluding livestock. Under the Crops Act, No. 16 of 2013, the authority oversees various activities such as the production, processing, marketing, grading, storage, collection, transportation, and warehousing of agricultural products, ensuring compliance with established standards (Section 4(b)). It also collects and compiles data, maintains a comprehensive database on agricultural products, and monitors the sector through the registration of relevant stakeholders. Additionally, the AFA determines agricultural research priorities and provides advisory services to guide the development of the sector. The Act delineates the roles of both national and county governments, with the national government focusing on policy, regulation, and research, while county governments handle local implementation and oversight. Through these mechanisms, the authority aims to enhance agricultural productivity, ensure sustainable practices, and support effective land and soil management in alignment with national development goals.

4.4.7.1 Development, preservation, and utilisation of agricultural land

Regarding the development, preservation, and utilisation of agricultural land, the Cabinet Secretary, on the advice of the Agriculture and Food Authority (AFA) and in consultation with the National Land Commission, is empowered to issue general land development guidelines (Section 21(1)). These guidelines apply to all categories of agricultural land and are aimed at ensuring the sustainable and productive use of land for agricultural purposes. The guidelines are to be implemented by the respective county governments, which must consider the unique circumstances of their areas when applying the guidelines (Section 21(2)). These guidelines may require the adoption of specific management or farming practices, as well as the execution of necessary tasks or the placement of certain structures or materials on the land, to ensure its proper development for agricultural use (Section 21(3)). This framework helps guide the

preservation of agricultural land, encourages best practices in farming, and supports sustainable land management at the local level.

4.4.7.2 Rules on preservation, utilisation, and development of agricultural land

The Cabinet Secretary, on the advice of the Agriculture and Food Authority and in consultation with the National Land Commission, is authorised to create general rules for the preservation, utilisation, and development of agricultural land (Section 22(1)). These rules may dictate how landowners, whether they are occupiers, should manage their land following good estate management practices (Section 22(2)). They may also specify how occupiers should farm the land in line with good husbandry practices. Furthermore, the rules could provide guidelines on the control or prohibition of certain agricultural practices, such as the cultivation of specific crops or the keeping of certain types of stock (Section 22(3)(a)). They may also regulate the construction of buildings and other structures on agricultural land.

In addition, the rules can include exemptions or conditional exemptions to ensure that vulnerable groups, including women, are not unfairly impacted. An agricultural landowner is considered to fulfil their responsibility if they manage the land in a way that allows the occupier to maintain efficient production of crops or livestock. An occupier is fulfilling their responsibilities if they maintain a reasonable standard of production, ensuring the land remains in good condition for future use and continued productivity (Section 22(3)(b)).

4.4.7.3 Soil conservation

Section 23(1) of the Agriculture, Fisheries and Food Authority Act empowers the Cabinet Secretary, on the advice of the Agriculture and Food Authority and in consultation with the National Land Commission, to establish national guidelines for soil conservation and the prevention of soil erosion. These guidelines can address various activities related to land preservation, including prohibiting, regulating, or controlling agricultural practices such as the burning, clearing, or destruction of vegetation if deemed necessary to protect the land from degradation, preserve water catchment areas, or maintain soil fertility. They may also require, regulate, or control afforestation and reafforestation efforts, as well as drainage measures such as constructing and maintaining drains, gullies, contour banks, terraces, and diversion ditches to prevent issues relating to salinisation, acidification, and soil salting. Additionally, the guidelines may mandate the uprooting or destruction of vegetation planted in violation of a land preservation order, without compensation, and ensure the supervision of unoccupied land to prevent neglect. Furthermore, they may prohibit, restrict, or control the use of land for

specific agricultural purposes, excluding livestock. The guidelines may include provisions for exemptions or conditional exemptions, allowing flexibility in their application. They may also specify conditions for granting permits or exemptions, limiting the application to certain periods, individuals, or areas, and requiring or prohibiting specific actions on land to benefit other lands or properties, even those under different ownership or occupation (Section 23(2)).

4.4.8 Crops Act, 2013

The objective of the Crops Act 16 of 2013 is to accelerate the growth and development of agriculture, boost the productivity and incomes of farmers and rural populations, improve the investment climate and efficiency of agribusinesses, and develop crops as export commodities to enhance the country's foreign exchange earnings. Under this Act, landowners and lessees of agricultural land, as stewards, are obligated to cultivate their land in a sustainable and environmentally friendly manner, ensuring that the land remains economically productive (Section 4(b)).

4.4.9 Irrigation Act, 2019

The Irrigation Act 14 of 2019 is aimed at the development, control, and improvement of irrigation schemes, along with related purposes. Section 3 of the Act establishes the National Irrigation Board, which is tasked with overseeing the development and management of national irrigation schemes in Kenya (Section 15(1)). The Cabinet Secretary, in consultation with the Board, has the authority to create regulations, including those governing standards of good husbandry and the control of pests and diseases in irrigation schemes (Section 27(1)(b)). These regulations may also outline methods for harvesting, storage, transportation, processing, marketing, and selling produce grown in such schemes (Section 27(1)(e)).

To implement these regulations, the Irrigation (National Irrigation Schemes) Regulations of 1977 were enacted. Under these regulations, individuals who reside, conduct business, or occupy any part of an irrigation scheme, or graze livestock there, must hold a valid license granted by the scheme manager and approved by the committee (Regulation 4). A critical condition for obtaining a license is compliance with specific guidelines on good husbandry, such as proper stock management (e.g., branding, dipping, inoculation), soil preservation, preventing erosion, and maintaining vegetation (Regulation 8(1)(f)). Failure to adhere to these conditions may result in penalties and the termination of the license by the Cabinet Secretary (Regulation 8(3)).

Licensees are prohibited from constructing any buildings or works on their land without prior written consent from the scheme manager (Regulation 10(5)).

Unauthorised construction must be demolished at the licensee's expense, and the land must be restored to its original condition, which includes addressing soil degradation. Additionally, the Irrigation Act bans the use of prohibited chemicals or substances in irrigation schemes. However, the illegal use of substandard fertilisers, chemicals, and polluted water highlights gaps in the effective implementation of the law.

4.4.10 Plant Protection Act, 2012

The Plant Protection Act Cap. 324 of 2012 empowers the Minister to make rules aimed at preventing and controlling the spread of pests or diseases affecting plants (Section 3). While the primary focus of the Act is plant health, it indirectly contributes to soil protection by safeguarding crop cover, which plays a critical role in preventing soil erosion. Healthy crops act as a protective barrier against soil degradation, ensuring that the soil remains intact and fertile for agricultural use. Therefore, the Plant Protection Act helps to maintain soil stability by controlling plant pests and diseases that might otherwise compromise crop health and increase the risk of erosion.

4.4.11 Mining Act, 2016

The Mining Act 12 of 2016 governs the extraction of minerals specified in the First Schedule of the Act, excluding petroleum and hydrocarbon gases (Section 3). It stipulates that a mineral right, license, or permit granted under the Act does not exempt the holder from complying with any laws related to environmental protection (Section 176(1)). A mining license will only be granted if the applicant has obtained an EIA license, conducted a social heritage assessment, and had the environmental management plan approved (Section 176(2)). This ensures that mining activities are carried out with consideration for environmental sustainability and compliance with regulations designed to protect the ecosystem.

4.4.11.1 Land use

Section 179 of the Mining Act mandates that holders of permits or licenses under the Act must use the land following the conditions outlined in their permit or license. This includes ensuring the sustainable use of land by restoring abandoned mines and quarries, preventing the seepage of toxic waste into natural water bodies such as streams, rivers, lakes, and wetlands, and disposing of toxic waste only in designated areas. It also requires that blasting and other activities causing significant vibrations be carried out in a way that minimises their impact, adhering to permissible vibration levels set

by the EMCA. Upon completion of prospecting or mining activities, the land must be restored to its original condition or as close as possible to its natural state, in a manner that is acceptable and reasonable. This provision ensures that mining activities consider long-term environmental sustainability and land rehabilitation.

4.4.11.2 Requirement of site restoration and mine-closure plans

The Mining Act stipulates that the cabinet secretary will not grant a prospecting, retention, or mining licence to an applicant unless the applicant has submitted site mitigation and rehabilitation plans, or mine-closure plans, for approval (Section 180(1)). These plans must be reviewed and approved before the licence is issued. Furthermore, the cabinet secretary has the authority to prescribe regulations that outline specific obligations related to site rehabilitation and mine closure (Section 180(2)). This ensures that mining operations are conducted with consideration for long-term environmental impacts and that adequate measures are in place for restoring the land after mining activities are completed.

4.4.11.3 Environmental protection bonds

The Mining Act requires applicants for a prospecting, retention, or mining licence to provide an environmental protection bond or other financial security (Section 181(1)). This bond must be sufficient to cover the costs associated with the applicant's environmental and rehabilitation obligations. The form and amount of the bond are determined by the cabinet secretary, considering the characteristics of the project and the applicant's obligations under the EMCA (Section 181(2)). The cabinet secretary can release part of the bond upon the satisfactory completion of rehabilitation measures during the licence period, and the bond can be fully released once all environmental and rehabilitation obligations are met (Section 181(3)). In cases of soil pollution, the bond can be used for soil restoration and rehabilitation. However, the effectiveness of these measures is challenged by issues in small-scale mining, where artisanal miners often operate without licences, and illegal use of toxic metals including mercury and lead in gold mining has caused significant soil pollution.[131]

The Petroleum Act 2 of 2019 provides a framework for the exploration, development, and production of petroleum, establishing environmental protections for upstream petroleum operations. It requires operators to adhere to environmental, health, safety, and best industry practices, ensuring that operations prevent pollution of soil, water, air, biodiversity, and other resources (Section 59(1)). Operators are required to

131 Odinga (2018).

use the best available technology, prevent waste, and mitigate environmental harm (Section 59(2)). They must also submit detailed plans before drilling wells, maintain emergency preparedness measures, and ensure that any environmental damage is restored to the original state (Section 60(1)). The cabinet secretary is responsible for managing disaster preparedness and coordinating emergency responses to incidents (Sections 67(1-2) and 69(1-2)). Additionally, individuals seeking to refine, import, export, or store petroleum products must obtain a valid licence from the Energy Regulatory Commission, which ensures compliance with environmental laws, and health, and safety regulations (Section 74(1)).

4.4.11.4 Liability for damage

The Petroleum Act imposes strict liability on contractors for environmental damage resulting from pollution related to their upstream petroleum operations, regardless of fault (Section 72). This liability extends to damages occurring within Kenya's borders or territorial waters.

Operators engaged in petroleum logistics, transportation, or sales must comply with environmental, health, and safety laws (Section 97(1)). In cases of fire, explosion, oil spills, injuries, or fatalities, the operator is responsible for cleaning up pollution or repairing damage at their own expense. This must be done to the satisfaction of the relevant licensing authority and other applicable authorities. Additionally, operators are required to maintain an oil clean-up plan in line with the National Oil Spill Policy and other environmental, health, and safety guidelines (Section 97(2)).

If an operator or transporter fails to act or delays unreasonably in addressing the pollution or damage, the licensing authority has the right to undertake the necessary remediation measures (Section 97(3)). The costs incurred are then charged to the operator or transporter. This provision ensures accountability and timely action to minimise environmental harm from petroleum-related activities.

4.4.12 Environment and Land Court Act, 2011

The 2010 Kenyan Constitution established a specialised court, the ELC, to address disputes related to land and the environment. This marked recognition of the critical importance of natural resources and sustainable land management in the country. The promulgation of the Environment and Land Court Act 19 of 2011 further underscored this priority.

However, the court has faced significant challenges in its nearly nine years of operation. A major issue has been the time spent defining its jurisdiction and its relationship with the High Court, which delayed the resolution of cases. Jurisdictional disputes

initially bogged down the court, slowing its capacity to adjudicate matters related to land use, land planning, and environmental protection. Additionally, the court has been persistently understaffed, despite the high volume of land and environmental cases requiring attention.[132] While land law is a mandatory subject in Kenyan law schools, there is a shortage of legal professionals with specialised competence in environmental and land law, further limiting the court's effectiveness.

These delays in resolving disputes have had indirect consequences, including contributing to environmental degradation. The slow adjudication process has often left land-use and environmental conflicts unresolved, hampering enforcement of sustainable land-use practices and environmental protections. Strengthening the court's capacity and specialisation is critical for improving its efficiency and mitigating environmental harm.

4.4.13 Fertilisers and Animal Foodstuffs Act

The Fertilisers and Animal Foodstuffs Act Cap 345 establishes the Fertiliser and Animal Foodstuffs Board of Kenya, tasked with ensuring that fertilisers imported, manufactured, or distributed within Kenya comply with prescribed quality and safety standards. The Act also explicitly prohibits the importation, manufacture, compounding, mixing, or sale of unapproved fertilisers or animal foodstuffs.

However, as highlighted in Chapter Two, most of Kenya's agricultural soils require frequent replenishment of nutrients to maintain productivity. The use of substandard fertilisers, often smuggled into the country, has significantly contributed to soil degradation. Alarmingly, instances of collusion between smugglers and government institutions have been reported, exacerbating the issue and undermining efforts to safeguard soil health.[133]

4.5 Jurisprudence on environmental protection

The courts in Kenya have played a pivotal role in interpreting the Constitution and various environmental laws, emphasising the right to a clean and healthy environment. Through their decisions, the judiciary has underscored the importance of upholding environmental protection principles, which include sustainable development and soil conservation. The case law discussed in this section illustrates how courts have understood and applied these principles and the effects on soil conservation and improvement.

132 See https://bit.ly/3pp4W1f, accessed 6 November 2019.
133 See *Afri Ventures (Kenya) Limited v Turbo Highway Eldoret Limited* [2014] eKLR; Ombati (2018).

4.5.1 *John Mutungu Waititu v China Wuyi (Keny*

a) Co. Limited [2018] eKLR

The appellant (John Mutungu Waititu) sued the respondent for failing to restore his land after excavating murram, leaving it vulnerable to soil erosion. The lease agreement required the respondent to refill holes and return the topsoil, but this was not done. The court defined environmental degradation as the depletion of natural resources including soil and found that the respondent's actions contributed to this. Instead of awarding damages, the court ordered the respondent to restore the land by topping up the soil, prioritising environmental restoration over monetary compensation. This decision emphasises soil conservation and environmental responsibility.

4.5.2 *African Centre for Rights and Governance (ACRAG) v Municipal Council of Naivasha* [2017] eKLR

The petitioner challenged the operation of a dumpsite near Naivasha, claiming it violated the constitutional right to a clean and healthy environment. The court directed the County Government of Nakuru to immediately clean up plastic litter and ensure ongoing waste management practices, such as incineration. The court also ordered the County Government to apply for a waste disposal license from NEMA within fourteen days, with a thorough EIA to consider alternative sites and mitigation measures, including the possibility of a modern landfill. Justice Munyao Sila also instructed the cabinet secretary responsible for the environment to review policy and compliance on solid waste management.

4.5.3 *Martin Osano Rabera, John Ndungu Kinyanjui v Municipal Council of Nakuru, NEMA & County Government of Nakuru* Petition No. 53 of 2012 eKLR

The petitioners, residents near the Gioto waste disposal site, claimed their right to a clean and healthy environment under Article 42 of the Constitution had been violated. Justice Ohungo ruled that the responsibility to ensure a clean environment lies with everyone, including the state, individuals, and organisations. The court emphasised that while the 2nd respondent had a technical role in environmental matters, the primary responsibility for waste management rested with county governments. The court ruled in favour of the petitioners, reinforcing the principle that waste management is a county government responsibility under the Fourth Schedule of the Constitution.

4.5.4 *Moffat Kamau v Aeolus Kenya Limited (the Kinangop Wind Park Project case) Nakuru* ELC Petition No. 13 of 2015 (2016) eKLR

In this case, the company initially received an EIA licence for a 30 MW wind power project in Kinangop, which was later transferred to Aeolus Limited. Aeolus expanded the project to 61 MW and increased the coverage from two km^2 to fourteen km^2 but applied for only a variation of the original EIA licence, not a new one. The petitioners challenged this decision. The court ruled that substantial changes in the project's scope required a fresh EIA rather than a mere variation of the original licence. It held that when there are significant changes in the project, such as in its size, site, technology, or environmental effects, a new EIA must be conducted before issuing a licence variation.

4.5.5 *John K. Kibicho (suing on behalf of the Milimani Residents Welfare Association) v County Government of Nakuru* Petition No. 13 of 2013 eKLR

In this case, the residents of Milimani in Nakuru opposed the construction of a multi-storey residential block in an area predominantly consisting of bungalows. The developer applied for a change of user, which was contested by the petitioners. Despite this, the Nakuru County Government approved the development without granting the petitioners a hearing. The court ruled that the change of user application required proper notification to adjacent landowners and public advertisement as per Section 41 of the Physical Planning Act. Since only one advertisement in one English daily newspaper was published, the court found the procedures were not followed and cancelled the change of user licence.

4.5.6 *Justus Irungu Githae v Attorney General* Case No. 804 of 2013 (2016) eKLR

In this case, the court issued an injunction against the County Government of Kirinyaga, halting its waste dumping on land adjacent to the petitioner's property. The petitioners argued that the county's actions threatened their right to a clean and healthy environment. The county government admitted in its response that it had not conducted an EIA before beginning the waste disposal. The court ruled that further dumping should be stopped until the petition could be heard.

4.5.7 *Joseph Leboo v Director Kenya Forest Service* Case No. 273 of 2013 eKLR

In this case, the plaintiffs challenged the issuance of licences by the KFS for tree felling in Lembus Forest. They argued that KFS had illegally allocated timber harvesting rights to both pre-qualified and unqualified sawmillers, without involving the local

community as required by law. Additionally, the saw millers were found to be harvesting trees that were not designated for their use and were cutting unspecified trees. The court noted that there was no management plan for the forest, which is a requirement under the Forest Act of 2005. The Act mandates a five-year management plan for each forest and prohibits KFS from issuing timber harvesting authorisations without a site-specific plan. Since these conditions were not met, the court issued an injunction halting any further tree harvesting in the forest.

4.5.8 *Raycon Limited v Superply Limited* Case No. 39 of 2017 (2017) eKLR

In this case, the plaintiff claimed to have been granted harvesting rights over exotic timber in the Mau Forest by the KFS. The plaintiff alleged that the first and second defendants had encroached on its allocated area and were illegally harvesting trees, seeking an injunction to stop their actions. However, it was revealed during the hearing that the plaintiff did not hold a valid licence for tree harvesting, despite being permitted by KFS to do so. The court also questioned how the first and second defendants were allowed to harvest timber, given the clear provisions in the Forest Act of 2016 that prohibit tree harvesting without a licence. The court was not convinced that either the plaintiff or the defendants had the necessary licences to harvest trees and issued a summons for the Director of KFS to explain why these parties were permitted to harvest timber in Mau Forest.

4.6 Conclusion

Soil conservation in Kenya is currently a secondary concern compared to broader land and environmental protection. While several laws touch on soil conservation, their impact is limited due to weak institutions, poor implementation, and corruption. Furthermore, soil conservation is not prioritised in development planning. Kenya's growing population, rapid infrastructure development, and its role as a regional business hub have increased pressure on land and soil. Population growth, urban sprawl, and industrialisation further exacerbate soil degradation, but legal measures have not evolved to address these challenges, often sidelining soil conservation in favour of production goals.[134]

To improve the situation, we recommend strengthening law enforcement, enhancing capacity-building, and improving coordination among institutions. While Kenya has a legal framework for soil protection, it is fragmented across various policies,

134 Mundia & Murayama (2010).

statutes, and international agreements, leading to overlaps, unclear responsibilities, and potential institutional conflicts.

A dedicated soil protection law could provide clearer focus and responsibilities, streamline resource allocation, and elevate soil conservation efforts. Such a law would encourage effective collaboration between institutions. The ELC, which already has a mandate to protect the environment, could play a crucial role in enforcing soil protection and developing a strong soil jurisprudence similar to environmental law.

5 Lessons learnt and recommendations for future legislation

Soil protection has been a focus in Kenya's policy and law since colonial times, with discussions at high political levels. However, there is currently no dedicated law for soil protection. While various laws contain provisions that can aid in soil conservation, the absence of a specific law means soil protection may be overlooked. This highlights the need for a consolidated law that incorporates existing soil protection measures.

5.1 Lessons learnt

The Constitution of Kenya recognises the right to a clean and healthy environment, including protecting the environment for current and future generations through legislative and other measures. This right encompasses a habitable environment with clean water, soil, and air free from toxins that threaten human health. It is intrinsically linked to other constitutional rights, such as the right to adequate food, freedom from hunger, and the highest attainable standard of health, providing a robust foundation to demand soil conservation and protection.[135] Kenya's judiciary, particularly after the 2010 constitutional reforms, has demonstrated a progressive approach to enforcing environmental rights. Courts have emphasised the interconnection between the right to a clean environment and socio-economic rights, as seen in *Friends of Lake Turkana Trust v Attorney General*,[136] which established that rights such as life, dignity, and economic rights are indivisible. Kenyan courts have interpreted the right to a clean environment broadly, inherently proscribing pollution and holding entities accountable for environmental harm,[137] as evidenced in *Save Lamu v National Environmental Management Authority (NEMA)*,[138] where an environmental impact assessment licence was nullified due to inadequate public participation. However, despite a comprehensive environmental legal framework, including the EMCA, 1999, soil conservation lacks the same

135 Okpara (2012).
136 See *Friends of Lake Turkana Trust v Attorney General* [2014] eKLR.
137 See *Pastor James Jessie Gitahi v Attorney General* [2013] eKLR.
138 See *Save Lamu v National Environmental Management Authority (NEMA)* [2019] eKLR.

level of attention and robust protection as water, air, forests, and wildlife. While laws such as the Fertilisers and Animal Foodstuffs Act ensure quality fertilisers and the Irrigation Act, 2019, restrict harmful substances, illegal practices including the use of substandard chemicals persist. Kenya's land tenure system—comprising private, public, and community lands—offers opportunities for collaborative soil conservation, with Article 69 of the Constitution obligating the state to ensure sustainable exploitation and management of natural resources.

Access to information is critical for soil conservation, as recognised in Article 35 of the Constitution and Kenya's Access to Information Act, 2016. This right is vital for enforcing environmental rights, yet the information available is often outdated and lacks geographical specificity, undermining efforts to curb unsustainable agricultural practices. Sustainable soil management demands an integrated approach that values both local and natural resources while incorporating targeted inputs and practices. Assigning economic value to land degradation could further help policymakers prioritise soil conservation, highlighting its benefits for food security and poverty reduction. Kenya's environmental governance is hindered by compartmentalised, sectoral laws that inadequately address soil-specific issues, with soil protection relegated as an incidental aspect of environmental management. Institutional coordination is insufficient, with conflicts between national and county governments over agricultural responsibilities creating inefficiencies.[139] Despite laws mandating environmental impact assessments, irregularities in their issuance contribute to environmental degradation. Similarly, enforcement mechanisms, such as those of the National Environment Management Authority (NEMA), face challenges due to weak inter-agency cooperation.

Urbanisation exacerbates soil degradation, particularly in counties such as Kitui, Machakos, and Makueni, where sandy soils and low rainfall increase susceptibility to erosion. Soil degradation disproportionately affects rural communities dependent on agriculture, linking it closely to poverty and food insecurity. Kenya's ambitions as a leader in the green economy and clean energy contrast with limited efforts to conserve soils, despite the critical role of soil carbon in climate change mitigation. Political goodwill is essential for successful legislative and policy reforms in soil conservation. Legislative proposals require the backing of both Parliament and the Executive, as political dynamics significantly influence the adoption of reforms. Recognising the political economy of soil governance is vital, as attempts to treat legislative changes as purely technical processes are likely to fail without addressing broader political contexts and stakeholder incentives. Thus, achieving effective soil conservation in Kenya requires a multifaceted approach that integrates technical, economic, and political considerations while fostering institutional collaboration and prioritising public awareness and information accessibility.

139 See *County Government of Migori v Privatization Commission of Kenya* [2017] eKLR.

5.2 Recommendations

Given the foregoing, the following recommendations are proposed to enhance soil conservation and protection in Kenya: The country should develop a comprehensive soil policy involving all stakeholders to establish principles and guidelines for soil management. Nationally, there is a need for participatory enactment of comprehensive soil legislation that embodies these principles. Given the devolution of agriculture to county governments under the Fourth Schedule of the Constitution, county assemblies should develop region-specific soil management laws tailored to the unique characteristics of their soils. Soil conservation measures should adopt an integrated approach, considering the interconnected nature of soil with other environmental components, and delineate the roles of national and county governments while ensuring harmonised institutional coordination.

To address lax enforcement, institutions such as the National Environment and Management Authority should collaboratively implement environmental laws related to soil protection, moving away from a fragmented sectoral approach. Enhanced penalties for breaches, alongside restoration taxes for offenders, should be introduced. Education on sustainable soil management must be integrated into school curricula to cultivate young champions of soil conservation, similar to climate change education initiatives. Accessible, updated soil quality information is essential for the public, particularly small-scale farmers reliant on soil for livelihoods. Conservation techniques including afforestation, reforestation, and low-cost soil protection technologies should be promoted. Incentive schemes, including subsidies for fertilisers and manure, should support small-scale farmers to improve soil fertility.

A holistic legislative approach is necessary, addressing erosion, acidification, salinisation, compaction, contamination, and nutrient loss, which contribute to soil degradation. Legislation must also consider the impact of activities such as land-use changes, urban expansion, intensive agriculture, specific farming methods, and deforestation on soil health and biodiversity. Recognising the transboundary nature of soil issues, soil conservation efforts should transcend political boundaries for effective management. These recommendations provide a basis for crafting robust, soil-specific legislation that integrates comprehensive strategies to sustainably manage and protect Kenya's soils.

5.3 Elements of a soil-specific legislation

A soil-specific law in Kenya should focus on the sustainable management of soils, with clearly defined purposes, objectives, and principles to guide its application. The law must establish a competent organisation to oversee soil-related issues, set priorities, and define its geographical scope and application areas. It should include a definitional section for clarity, with objectives centred on soil conservation, preventing degradation, and improving fertility to ensure food security. Rights and responsibilities

of various stakeholders should be delineated to promote accountability, while special provisions must protect marginalised groups such as women, the poor, and communities in arid and semi-arid areas, recognising their disproportionate vulnerability to soil degradation. A robust institutional framework is essential, including a national soil authority tasked with overseeing soil information, planning, evaluation, and monitoring, alongside a devolved expert advisory body to guide legal, strategic, and policy issues. Public and community participation must be mandated to align with Kenya's constitutional value of inclusivity, ensuring local insights inform soil management. The law should also provide for national soil strategies and policies, reviewed periodically to adapt to sectoral changes. Harmful activities must be explicitly prohibited, with the authority empowered to enforce penalties. Provisions for research, capacity building, and regular monitoring, particularly in erosion-prone areas, are critical for effective soil management. A guaranteed financing scheme should support resource-intensive conservation efforts, and the law should uphold the constitutional right to soil information to ensure government accountability. Recognising the transboundary nature of soil degradation, the law must facilitate cooperation with neighbouring countries and counties. Gender-sensitive provisions are vital to address women's critical role in soil and land management and their heightened vulnerability to degradation. Finally, the law should establish liability and redress mechanisms, granting the National Environment Tribunal original jurisdiction for soil-related disputes and allowing appeals to the Environment and Land Court, ensuring effective dispute resolution. This comprehensive approach would promote sustainability, equity, and accountability in soil governance across Kenya.

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