Commentaries to the Model Law on Soil Management in Africa

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1. Introduction

Soil is the silent foundation of Africa's food security, ecological resilience, and sustainable development. Yet across the continent, soils face mounting pressures from unsustainable land use, climate change, urban expansion, and competing economic interests. These challenges threaten not only agricultural productivity and food security but also the broader goals of poverty reduction, environmental sustainability, and human well-being. Recognising this, the Pan-African Parliament (PAP) has developed the Model Law on Soil Management. The following detailed Commentaries complement the Model Law by providing interpretive guidance, policy options, and draft legislative provisions.

The Commentaries collected here neither aim to be comprehensive in nature nor do they form part of the Model Law, but rather shall serve as a practical toolbox for policymakers, legislators, practitioners, and civil society. Each Commentary addresses a critical theme of soil governance—ranging from awareness-raising, crop cultivation, and dispute settlement to data management, fertilisers, foreign investment, gender equity, mining, migration, pesticides, pastoralism, urbanisation, tenure rights, and the role of traditional leaders. Together, these contributions bridge the gap between broad legal principles and the concrete realities of African governance systems, offering context-sensitive strategies, mechanisms and instruments for implementation and enforcement.

By combining comparative research, legal analysis, and practical recommendations, the Commentaries aim to ensure that the Model Law is not merely an abstract framework but an actionable tool for strengthening national soil governance. They also highlight the interconnections between soil health and Africa's

1 The authors and editors also wish to express their sincere gratitude to the Pan-African Parliament (PAP) delegation that attended the Write-Shop and Consultative Meeting on the Finalisation of the Model Law on Soil Management in Africa, held at Lanzerac Estate, Stellenbosch, South Africa, from 28–29 April 2025. The delegation's valuable insights, guidance, and constructive engagement significantly contributed to the refinement of the Commentaries. Special thanks are extended to Phebe Clement Mavungu (Legal Counsel, PAP); Hon. Sulayman Saho (The Gambia), Member of the Pan-African Parliament; Hon. Garry Sakata (DRC), Chairperson of the PAP Committee on Rural Economy, Agriculture, Natural Resources, and Environment; Hon. Abdallah Barakat Ibrahim (Djibouti), Vice-Chairperson of the same Committee; Hon. Awatef Cheniti (Tunisia), Member of the same Committee; and Dr Ndidi Abanno (Senior Committee Clerk, PAP).

broader developmental priorities, including food security, climate mitigation and adaptation, biodiversity conservation, economic prosperity, and social equity.

In this way, the Commentaries underscore that protecting Africa's soils is not simply an environmental imperative. It is a legal, economic, and moral responsibility—one that requires inclusive governance, innovative policy design, and sustained commitment at all levels of society.

All Commentaries follow the same structure. First, the challenges of the specific policy topic are explained, followed by policy options to address them through legislative and administrative means. Finally, each Commentary entails concrete text proposals.

2. Commentary I: Awareness raising and capacity building

While most African countries have established legal and policy frameworks that incorporate environmental education and public awareness initiatives, this Commentary highlights a significant gap in public understanding and engagement, particularly regarding the crucial role of soil in sustaining life. The far-reaching impacts of soil degradation on both present and future generations remain poorly recognised. This Commentary highlights specific governance mechanisms to address the challenges of limited awareness and capacity-building for sustainable soil management in Africa.

By increasing awareness and education, African countries can enhance public support for soil sustainability and foster a long-term commitment to more responsible soil management. The interrelationships between soils and socio-economic issues, such as agriculture, food security and safety, sustainability, climate change, carbon sequestration, greenhouse gas emissions, soil degradation through erosion, and loss of organic matter and nutrients, need to be simplified and consistently communicated through educational awareness programs to all stakeholders.

2.1. Description of challenges

Most African nations have legal frameworks that address environmental protection and indirectly support soil conservation and sustainable land management. These African laws and policies largely acknowledge the importance of environmental and soil information, as well as public participation; however, weak implementation remains a significant challenge. Additionally, these laws often lack the specificity needed to address soil health comprehensively.

Further, a lack of awareness and education among key stakeholders about soil conservation hampers effective mitigation. Smallholder farmers face numerous

challenges, including low soil fertility, limited access to equipment, and insufficient income. Additionally, they often struggle to access climate information and lack basic agricultural knowledge.

Access to accurate and up-to-date soil-related information is essential for effective awareness-raising and capacity-building efforts. However, across much of Africa, inadequate investment in research and innovation continues to impede the development of modern soil conservation technologies. Compounding this challenge are fragmented land management systems that often favour immediate economic returns over long-term soil health. Consequently, soil data across the continent is frequently outdated, insufficient, and rarely supported by geospatial referencing. This lack of reliable information contributes to limited public awareness about the scale and severity of soil degradation. The problem is particularly acute within agricultural extension services, where access to timely soil health information is vital but remains largely unavailable in many regions.

Most African countries are also ill-prepared for climate risks, with indigenous knowledge of soil conservation often overlooked. Uncoordinated research and information generation related to soil also compounds the existing challenges.

Women play a vital role in land and soil management, particularly in rural areas across Africa. They head nearly one-third of rural households and contribute up to 70% of household food production. Despite their central role in sustaining agricultural livelihoods, women are frequently excluded from decision-making processes related to sustainable soil management due to entrenched cultural, religious, and institutional biases.

To succeed in raising awareness of soil, "an up-to-date and effective definition of soil that directly focuses the public's attention on its economic value"[2] is needed. This will require promoting awareness of the soil's critical role in shaping sustainable soil governance, agriculture, food security, climate change mitigation and adaptation, freshwater availability, and biodiversity conservation.

2.2. Options of legal governance mechanisms

Increasing women's participation in soil research, policy development, and decision-making is essential to advancing sustainable soil management across Africa. To support this, women, particularly in rural areas, must have improved access to land, credit, and other essential resources and services. Empowering women in this way strengthens both environmental stewardship and community resilience.

Civil society organisations (CSOs) play a crucial role in collecting, publishing, and disseminating environmental data, as well as raising awareness of environmental

2 Dazzi & Papa (2022).

issues. CSOs and the media must partner more closely on soil-related awareness campaigns and information dissemination to enhance capacity, promote transparency, and foster public engagement.

Strengthening institutional capacity and raising public awareness about the importance of soil data transparency are critical steps toward sustainable soil management. This requires improving both the accessibility and quality of soil data through collaborative efforts between governments, civil society, and local communities.

In most African countries, agricultural extension programs are well-established and play a crucial role in raising awareness among farmers and local communities about sound soil management practices, including conservation, erosion control, and sustainable farming techniques. To maximise their impact, these efforts must be complemented by specialised training and broader awareness campaigns delivered through media platforms, community events, and public forums.

Traditional leaders hold a position of deep respect within their communities and are recognised as influential actors within many African governance systems. As such, they serve as a key institution for promoting awareness and delivering educational initiatives on soil and environmental stewardship. Their moral authority and strong communication networks position them well to promote environmentally responsible behaviours, particularly by transmitting indigenous knowledge and sustainable land and soil management practices. However, the effectiveness of their role depends on several factors, including meaningful collaboration with government authorities and the active engagement of local communities.

Traditional knowledge and community participation are vital components of effective soil governance. Integrating indigenous soil management practices with modern scientific approaches can offer context-specific solutions to soil degradation across the continent. In many African societies, the deep cultural and emotional connection to land fosters a strong sense of responsibility and motivation for sustainable practices. When harnessed effectively, these connections can empower traditional leaders and communities to take an active role in soil protection efforts.

Equally important is the need for clear, focused messaging and sustained public awareness campaigns to build support for soil protection policies. These campaigns should address locally relevant concerns and resonate with diverse audiences by blending traditional knowledge with contemporary scientific insights. Leveraging both digital platforms and grassroots initiatives presents a powerful means to educate, engage, and mobilise communities in support of sustainable soil management.

Strengthening legal and policy frameworks, decentralising natural resource management, enhancing political will, increasing local authority involvement, and integrating environmental considerations into all development sectors would help achieve sustainable soil governance in Africa.

Raising awareness among young people about the importance of soil conservation is essential, not only to promote sustainable practices but also to challenge historical and cultural barriers that have hindered broad-based engagement. Integrating sustainable soil management into school curricula is crucial for fostering environmental stewardship from an early age. By educating children about the importance of soil health and its central role in food security, climate resilience, and ecosystem sustainability, African countries can cultivate a generation committed to protecting the soil. Early exposure to these concepts encourages responsible behaviour and advocacy, with positive ripple effects across families and communities. This approach ensures the long-term preservation of soil as a vital resource and empowers young people to contribute actively to environmental sustainability and local development.

Equally important is the establishment of robust national soil information systems and centralised institutional frameworks to guide evidence-based decision-making. Improved coordination across sectors, including agriculture, environment, land, and mining, is essential for data sharing, research, and the implementation of sustainable soil management practices. Collaboration between research institutions and civil society organisations can play a key role in raising public awareness, generating knowledge, and driving legal and policy reforms. Creating platforms for cross-sectoral cooperation and stakeholder coordination would be instrumental in this regard.

Another strategic priority is establishing specialised educational and training institutions focused on soil conservation and management. These institutions would equip professionals with the technical and interdisciplinary skills needed to address soil degradation while also enhancing communication among scientific, legal, and policy communities. Such capacity building would contribute meaningfully to the development of coherent soil governance frameworks and more effective public policy.

2.3. Concrete text for legal provisions

2.3.1. Soil awareness strategy

Promoting awareness and building capacity in sustainable soil management requires a multi-faceted approach that engages stakeholders at all levels. Some of the strategies to consider are:

- Develop an enabling policy and legislative environment to promote and encourage awareness raising and capacity building on sustainable soil governance.
- Align public policies with local development plans to support sustainable practices and incentivise community participation.

- Finance or raise funds to support programmes to promote or facilitate sustainable soil governance.
- Collaborate with government agencies, research institutions, civil society, local communities, and the private sector to create a unified vision for sustainable soil management. Possible partnerships include cooperation, coordination, multisector collaboration, or networking.
- Establish networks and working groups that facilitate the exchange of information, ideas, and experiences.
- Launch targeted media campaigns, community events, and workshops highlighting the importance of healthy soils.
- Integrate indigenous knowledge systems with modern systems to communicate the benefits of sustainable soil practices.
- Integrate soil management topics into school curricula and vocational training programs to raise early awareness among future generations.
- Develop specialised training programs, workshops, and certification courses for professionals and local community leaders.
- Develop awareness-raising toolkits for the appropriate stakeholders.
- Establish or support educational institutions focused on soil conservation and management.
- Leverage online learning platforms, interactive websites, and mobile applications to disseminate best practices and up-to-date research findings on soil health.
- Promote community projects that showcase sustainable soil management techniques.
- Establish and fund events that promote soil conservation, such as contests on select soil topics, and award prizes and recognition to outstanding participants.

2.3.2. Legal implementation

- The competent authority shall publish any information on the protection, conservation, management, and utilisation of the soil resource as it considers necessary for public education and awareness.
- The competent authority shall establish and operate a Central Soil Information System to store any findings, data, and statistics generated by both public and private bodies during soil preservation and management.
- The competent authority shall, in consultation with all other competent authorities, particularly those at local and regional levels, take measures to integrate soil preservation and management matters in schools, colleges, and institutions of higher learning.

- The competent authority shall facilitate greater public awareness of the cultural, economic, and social benefits of conserving and increasing sustainable soil management by developing programmes in training, research, and public education.
- The competent authority may enhance its employees' skills, knowledge, and effectiveness by providing, or assisting in providing, facilities for training, education, and research, including awarding scholarships for such training.
- The competent authority shall establish a Soil Conservation Fund or an equivalent, whose objectives include promoting awareness of the importance of protecting, developing, and sustainably using soil resources through public education and training.
- The competent authority shall determine the structure and modalities of cooperation with the private sector, local communities, and civil society.

3. Commentary II: Crop cultivation

Most soils in Sub-Saharan Africa have developed from highly weathered parent materials. These soils are generally old, heavily leached, and characterised by low natural fertility, including low organic matter content, limited cation exchange capacity, and low base saturation. To address these constraints and improve agricultural productivity, farmers have increasingly adopted soil management practices that enhance soil health and boost food production.

3.1. Challenges

Agriculture in Sub-Saharan Africa (SSA) is predominantly driven by smallholder farmers, whose production is primarily geared toward household food security, with limited semi-commercial and commercial operations. This structure contributes to persistently low productivity, widespread food insecurity, poverty, particularly among farming households, and ongoing environmental degradation. In a context where nearly half of the population is engaged in farming, both the production and consumption dimensions of food systems must be strengthened to achieve Sustainable Development Goals (SDGs) 1 and 2, which aim to eradicate poverty and achieve zero hunger.

Crop farmers in SSA face many challenges that undermine their productivity and food security. The following are some of the challenges:

- Inadequate soil health information to establish soil limitations and requirements: Stakeholders (from government agencies to farmers) must improve

data access, soil test information, and soil health management to make informed decisions in SSA's agricultural sector.

- Nutrient mining and imbalance: Africa loses between 30 and 60 kg of nutrients per hectare each year while using only one-tenth of the average application of fertiliser compared with the rest of the world.[3]
- Food and nutrition insecurity: The 2024 Nairobi Summit on Africa and Soil Health affirmed that the challenges of food and nutrition insecurity, malnutrition, and climate change remain persistent across the continent and require urgent and coordinated action.
- Increasing yield gaps: Currently, yields of major food crops in SSA are below 1.0 t ha^{-1} compared to 5.0 t ha^{-1} levels in other parts of the world.[4]
- Land degradation: The Nairobi 2024 Summit declared that building soil health and regenerating degraded soils are crucial for transforming sustainable food systems and are a prerequisite for the efficient and effective use of fertilisers.
- Declining soil fertility: Recent studies confirm that soil fertility decline remains widespread in sub-Saharan Africa.[5]
- Climate change and food production: Farmers experience severe droughts more frequently, especially in the dry semi-arid regions of the Sahel, which already experience low rainfall and variations in the length of the growing season.

Other challenges include:

- Inadequate knowledge of soil management and extension services.
- Financial constraints.
- Soil salinisation and acidity.
- Dependence on blanket fertilisation and imported fertilisers.
- Limited adoption of integrated soil fertility management (ISFM) technologies.
- Improved soil health approaches vary from one location to another (inconsistent application).
- Use of current soil data and advisory service to guide soil management.
- Use of soil amendments (e.g., liming when the soil is acidic or gypsum when the soil is alkaline).
- Controlling soil erosion by cover cropping, strip-cropping on slopes or terracing on the uplands, contour ploughing, tied ridging, etc. (whichever is appropriate for the location) for improved soil and water conservation.
- Always maintaining soil cover where practicable.
- Improving soil organic matter by applying organic manure and compost or incorporating organic residues and cover crops.

3 Batono & Wanswa (2011).
4 Ongoma et al. (2025).
5 FAO (2025c).

- Intercropping cereals with legumes (e.g., maize, sorghum, or soybean).
- Adoption of Integrated Soil Fertility Management Technologies (ISFM).
- Application of recommended inorganic fertiliser nutrients (N, P, K, Zn, etc.) at appropriate soil depth and at critical stages of crop growth (at the correct rate, right time, right type, and proper placement).
- Application of mulch to conserve moisture and minimise soil erosion.
- Adoption of agro-ecological approaches.
- Planting of leguminous trees to fix nitrogen and carbon (organic matter) in agroforestry systems.
- Prevention of wildfires to improve the accumulation of soil organic matter.

3.2. Options for legal governance mechanisms

3.2.1. Preconditions for effective legal governance

- Funding: For legal soil management governance to be effective, funding to acquire the necessary logistics for monitoring and enforcing the law is crucial. Many policies and laws remain on the books without being implemented due to inadequate enforcement capacity.
- Inadequate knowledge and skills; thus, training is required. There is a need to build the capacity of those using the soils and those responsible for enforcing laws on sustainable soil management. More extension workers should be trained in improved soil management technologies so they can share this knowledge with smallholder farmers who may be relying on outdated practices.
- Technological innovations: Smartphones and other digital devices, drones, and satellite images can contribute to soil governance and the enforcement of laws on soil degradation.
- Markets and value addition: Markets drive technology adoption. With improved markets and value-added farm produce, farmers could be better positioned to adopt and implement recommended soil management technologies. However, poverty and limited resources often hinder the adoption of recommended soil management practices.
- Monitoring and evaluation systems must be available to ensure effective monitoring of programmes and related initiatives.

3.2.2. Policies and strategy

Policy interventions:

- Support of farmers to purchase crop insurance;
- price stabilisation;
- subsidies on agricultural inputs (fertiliser, lime, seed, etc.);
- strategic grain reserves; and
- use of market-hedging instruments.

3.2.2.1. Actions by individuals

- Individuals managing soils must act as stewards to ensure that soils are managed sustainably.
- Undertake sustainable soil management in the production of crops.

3.2.2.2. Actions by groups and the science community

- Disseminate information and knowledge on sustainable soil management.

3.2.2.3. Actions by the government

- Support a research programme that will provide sound scientific backing for developing and implementing sustainable soil management relevant to end users.
- Incorporate the principles and practices of sustainable soil management into policy guidance and legislation at all levels of government, ideally leading to the development of national soil policy.
- Explicitly consider the role of soil management practices in planning for adaptation to, and mitigation of, climate change and maintaining biodiversity.
- Establish and implement regulations to limit the accumulation of contaminants beyond established levels to safeguard human health and well-being and facilitate remediation of contaminated soils that exceed these levels where they pose a threat to humans, plants, and animals.
- Develop and maintain a national soil information system and contribute to the global soil information system.

3.2.2.4. Actions by international organisations

- Coordinate efforts to develop an accurate, high-resolution national soil information system.
- Assist governments in establishing appropriate legislation, institutions, and processes to mount, implement, and monitor appropriate sustainable soil management practices.

3.3. Concrete legal text

The legislative provisions may be integrated into existing agricultural laws or other laws that concern agrarian resources. The legal text aims to promote sustainable soil management in crop cultivation. The matters covered therein are not exhaustive.

Definitions

(1) Sustainable Soil Management (SSM): [exact definition in the Model Law].
(2) Crop Cultivation means the agricultural production process involving the growing of crops for food, feed, fibre, fuel, or other uses.
(3) Fertilisers means any compound or natural substance applied to soils or plants to supply one or more essential nutrients, OR as defined in domestic laws.
(4) Pesticides means chemical, biological, or physical agents intended to manage pests, diseases, and weeds which impact crop production OR as defined in domestic laws.

Section 1. Sustainable Soil Management in Crop Cultivation

(1) The competent authority responsible for agriculture, in coordination with the competent authority responsible for soil, shall develop and promulgate guidelines for sustainable soil management in crop cultivation.
(2) The guidelines shall include, but are not limited to:
    (a) Soil preparation and conservation techniques;
    (b) Crop rotation and intercropping strategies; and
    (c) Organic and integrated nutrient management practices.
(3) These guidelines shall be updated regularly to reflect advances in research and local agro-ecological conditions.

Section 2. Dissemination of Information and Knowledge

(1) A comprehensive outreach and extension program shall be established by the competent authority to disseminate best practices in sustainable soil management to farmers, extension workers, and rural communities.

(2) The outreach and extension program shall utilise diverse platforms, including mobile units, digital media, printed materials, community workshops, and demonstration sites, to ensure broad accessibility and effectiveness.
(3) The competent authority shall partner with academic institutions, non-governmental organisations, and local agricultural cooperatives to enhance the reach and relevance of the outreach and extension program.

Section 3. Support for Scientific Research
(1) The competent authority shall establish a Fund to support innovation in soil management practices.
(2) This Fund shall provide financial grants, scholarships, and research awards to public and private entities engaged in studies related to soil health and sustainable crop production, including studies on the integration of traditional knowledge with modern soil science.

Section 4. Integration of Sustainable Soil Management Principles in Agricultural Policies
(1) The principles of sustainable soil management shall be embedded in all national and local agricultural policies, ensuring alignment with soil and environmental protection and food security objectives.
(2) All relevant agricultural, environmental, and land-use policies shall be reviewed and amended, as necessary, to incorporate sustainable soil management principles.
(3) A cross-sectoral policy committee shall be established to ensure consistency and coherence across government policies.

Section 5. Incentives to Farmers and Agricultural Stakeholders
(1) The government shall provide fiscal and technical incentives to promote the adoption of sustainable soil management practices among farmers.
(2) Incentives may include:
  (a) Tax relief and deductions;
  (b) Subsidised loans and grants; and
  (c) Other incentive programmes established by the government.
(3) Special funding mechanisms shall be established to support smallholder farmers and vulnerable communities in adopting soil conservation techniques.
(4) The criteria for accessing these incentives shall be developed transparently, ensuring they target small and marginalised farming communities while rewarding demonstrable improvements in soil health.

Section 6. Regulation on the Use of Fertilisers and Pesticides

(1) The competent authority shall formulate and enforce regulations concerning the selection, storage, application, and disposal of fertilisers and pesticides.
(2) All users must comply with prescribed application methods, timing, and dosage to minimise environmental harm and prevent soil degradation.
(3) Training and certification programs shall be mandated for agricultural professionals to ensure safe and calibrated use of these agro inputs.
(4) Violations of these regulations may result in penalties including fines, suspension of licences, or revocation of permits, or other sanctions as determined appropriate by regulatory authorities.

Section 7: Monitoring

(1) The competent authority shall establish a monitoring and evaluation framework to assess:
    (a) The implementation of sustainable soil management practices;
    (b) Compliance with fertiliser and pesticide regulations; and
    (c) The overall impact of the law on soil health and crop productivity.
(2) Annual reports detailing progress, challenges, and recommendations shall be submitted by the competent authority to the Parliament and shall be available for public inspection.

4. Commentary III: Dispute settlement

This Commentary examines the challenges of resolving soil disputes in Africa. It highlights the lack of specialised courts, the limitations of traditional dispute resolution mechanisms, and the difficulties in accessing justice. The Commentary proposes various policy options for addressing these challenges, including maintaining the *status quo*, enhancing the jurisdiction of existing land courts, and establishing specialised courts or divisions. It outlines legislative elements and text proposals that could be incorporated into national legal frameworks to improve dispute resolution processes, promote sustainable soil management, and ensure access to justice for all, including disadvantaged groups.

4.1. Description of challenges

Most soil disputes arise from land-related activities, including agriculture, urbanisation, industrialisation, and mining. All African states maintain mechanisms to resolve land disputes. Although soil is recognised as a separate natural resource in

many national environmental laws, it is often treated as incidental in land and environmental disputes.

Furthermore, while most African states have various mechanisms to resolve land disputes, including courts, there is diversity in how these courts exercise jurisdiction. These include environmental courts, green chambers, designated green judges in general courts, independent tribunals, quasi-independent environmental tribunals, and captive tribunals. Kenya's Environment and Land Court (ELC) remains the most advanced type of environmental court in Africa, with expansive jurisdiction over land and environmental disputes. Due to this lack of specialisation and comprehensive laws dedicated to sustainable soil management, soil disputes are not effectively adjudicated.

In addition to courts of ordinary jurisdiction, most legislation provides administrative mechanisms to resolve disputes arising from the application of legal provisions. While some administrative bodies are effective, evidence suggests that others do not perform their statutory duties for various reasons, including a lack of resources and expertise.

Due to the dual nature of many African legal systems, most countries recognise traditional or customary law mechanisms to resolve disputes. However, in most instances, the jurisdiction of these customary courts is limited to matters of customary law, such as inheritance. Furthermore, most customary laws have not evolved to encompass all aspects of sustainable soil management. However, the case of Madagascar is different, as Malagasy law is still strongly influenced by custom, which remains a living source of law.

Access to courts or justice is another issue in land and soil disputes. This includes *locus standi*, access to legal aid for indigents, costs, and procedural rules. In some countries that recognise the right to a safe, clean, and healthy environment such as South Africa (Sections 24 and 38, Constitution of the Republic of South Africa); Kenya (Articles 22 (1) and 258 of the Constitution of the Republic of Kenya), Zimbabwe (Section 85 of the Constitution of the Republic of Zimbabwe), the rules on *locus standi* gives legal standing to persons to enforce environmental legislation in the public interest or the interest of the environment.

4.2. Sources and types of soil disputes

While land-based activities are fundamental to every economy, they can also lead to disputes. These conflicts may arise from the proposed or actual use of land resources. For instance, mineral extraction is often incompatible with agricultural activities, creating a natural source of tension. Most conflicts over soil resources stem from various factors, often involving land. Typically, one or more of the following key issues are at play: (1) disputes over land tenure/ownership; (2) disagreements over access to natural resources; (3) disputes over decisions or authorisations made by the

competent authority over a particular resource; and (4) conflicts over distribution of resource revenue, benefits, and burdens. Some of the characteristics that influence the dynamics of conflicts over soil resources include:

- Availability, quality, and perceived value of soil resources.
- Numerous actors and stakeholders with diverse interests exist, including nation-states, local governments, ethnic groups, communities, civil society organisations, and private companies.
- Significant power imbalances and asymmetries between the parties (e.g., international corporations versus local communities, or lack of formal representation of a specific livelihood group in decision-making).
- Legal pluralism—a combination of customary and statutory institutions, or a hybrid political order.

4.3. Options of legal governance mechanisms

To ensure sustainable soil management, legislation must include provisions for resolving disputes over soil access and use. Numerous approaches exist for resolving disputes, including litigation/adjudication, Alternative Dispute Resolution (ADR) [i.e., mediation, arbitration, and conciliation], and administrative solutions.

4.3.1. Policy options

4.3.1.1. Option A: maintenance of the status quo

This option involves utilising existing dispute resolution mechanisms. It is optimal for countries with advanced dispute resolution mechanisms, such as specialised environmental courts or tribunals that adjudicate environmental disputes across various forums. It is also optimum for countries that do not have a specialised environmental court or tribunal, but whose judicial systems are advanced. Some of the indicators are:

(1) independent judiciary;
(2) presence of specialised divisions in the ordinary court structure, i.e., environment law division;
(3) specialised human personnel on soil management or environmental management, or natural resources management;
(4) advanced/comprehensive laws on natural resources management, including soil management;
(5) easily accessible courts [including distance, rules on *locus standi* and costs]; and

(6) available and functional ADR mechanisms.

Therefore, where existing systems, whether courts, tribunals, or indigenous justice systems, are sufficiently equipped to deliver environmental justice and solve soil disputes, the *status quo* must be maintained. However, a country must consider reforms within the existing system, such as judicial training or refresher courses, the employment of more experienced judges, or improved access to the courts through mobile courts.

4.3.1.2. Option B: enhancing land courts/tribunals

Option B is intended for countries without specialised environmental courts or tribunals; however, they do have land courts, tribunals, or other local dispute-resolution bodies. These land courts or bodies primarily determine land disputes and hear appeals and reviews of decisions made by public bodies concerning land. Land disputes are generally defined as disagreements between two or more parties over the ownership or use of a specific piece of land. Often, land rights directly affect the use of a particular area, making the inclusion of environmental considerations in decisions about these rights crucial. In some jurisdictions, such as Botswana, the Minister may withhold consent for the transfer of agricultural land if the transfer is likely to lower the standards of good husbandry on that land. A crucial component of good husbandry is farming sustainably, with a concern for the health of both soils and animals. Therefore, since considerations for refusing to grant certain land rights include environmental factors, it would be prudent to extend the jurisdiction of land courts or tribunals to cover environmental issues. This policy option is not novel in Africa; Kenya has an Environment and Land Court that addresses disputes over both land and environmental issues.

The principal advantage of this option lies in its use of established legal frameworks within existing jurisdictions, thereby facilitating cost-effectiveness. Furthermore, this approach promotes the integration of land use and environmental regulations, which are inherently interdependent. By augmenting the jurisdiction of specialised land courts, this option ensures consistency in decision-making and jurisprudence, mitigating the risks of divergent outcomes when different adjudicators address the same issues at different times.

4.3.1.3. Option C: establishment of specialised courts or divisions

Establishing specialised courts and tribunals remains a contentious issue among judges, legislators, governmental officials, advocates from non-governmental

organisations, academics, and members of civil society. Arguments favour specialised courts underscore the necessity of having decision-makers with expertise in environmental law, promoting consistency and efficiency within the judicial system, and establishing robust oversight and accountability mechanisms. Conversely, objections to specialised courts or divisions highlight the potential for fragmentation of the judicial system, which may isolate judges and relevant subject matter from the broader legal framework. Additionally, concerns arise regarding the significant costs associated with the establishment of specialised courts, the heightened risk of judicial "capture" by a small cohort of people or organisations, and the challenge of determining the appropriate jurisdiction for cases that involve cross-cutting environmental issues, thus complicating the decision-making process regarding whether such "mixed" cases should be adjudicated in specialised courts or general courts. These advantages and concerns are also relevant to Option B, which proposes enhancing the jurisdiction of land courts/tribunals.

4.3.2. Legislative elements

The following elements are to be reflected in legislation:

(1) The role, responsibilities, and powers of a court concerning the hearing and settlement of disputes over access to and use of soil.
(2) How individuals may obtain access to the court.
(3) The rules for a court to follow in adjudicating soil disputes.
(4) Disclosure and submissions, including protection of the confidentiality of sensitive information.
(5) Alternative dispute resolution mechanisms to resolve soil disputes.
(6) The appointment of adjudicators and mediators conversant with sustainable soil management or the environment.

In addition to these general elements, the legislation must also cater to disadvantaged groups within society. These are typically the primary users of soil for agricultural activities. They may have limited access to information, knowledge, opportunities, and services due to their socioeconomic status, ethnic background, or geographic location. These include people who live and farm traditionally, indigenous people, persons with disabilities, refugees, and women. As such, legislation should consist of procedures in soil legislation to:

(1) Outline the role and responsibilities of a court in relation to the special needs of the disadvantaged people and the sustainable use of soil.
(2) Enable ready access for disadvantaged people to a court of law in relation to disputes over the sustainable use of soil.
(3) Set out procedures to enable disadvantaged people to obtain legal aid.

(4) Establish a special mediation procedure [or other alternative methods] for disadvantaged people.
(5) Ensure fair and equitable discussions, disclosures, and submissions in relation to soil disputes.
(6) Enable the appointment of a mediator conversant with the special needs of disadvantaged people, particularly in relation to cultural and traditional manner and land use.

4.4. Text proposals

The proposed provisions enhance existing or future soil legislation by establishing essential elements for an effective soil dispute resolution mechanism. The court-proceedings provisions apply to all proposed policy options. In contrast, provisions on complaints and investigations empower the institution responsible for sustainable soil management to address stakeholder concerns before they escalate to litigation. Therefore, the proposals for resolving or settling soil disputes can be incorporated into the existing and/or prospective soil legislative framework.

Resolution or settlement of soil disputes—Interpretation
"Competent authority" means a body or institution responsible for the sustainable management of soil resources.
"Soil dispute" means a dispute that arises in relation to the access, use, control, and management of soil resources.

Part I - Complaints and investigations[6]

Lodging of complaints
(1) Any person may lodge a complaint with the competent authority against violations of the provisions of this Act.
(2) The competent authority shall assist the complainant, where necessary, in submitting a written complaint.

6 Part I provides an opportunity for the competent soil authority to remedy complaints filed by various stakeholders. The provisions herein are both preventative and reactive, particularly with respect to the authority granted to the competent soil authority to conduct investigations on its own motion. Section 2(1) provides for *locus standi*. "Any person" in this instance has to be construed liberally, therefore, giving legal standing to persons to enforce soil legislation in the public interest or the interest of the environment. Moreover, the provisions outlined in Section 6(2)–(4) enable parties to resolve their disputes through mutual consent; however, such consent is subject to confirmation by the competent authority. This requirement addresses potential power imbalances and the limited expertise or knowledge between the disputing parties.

(3) The competent authority shall conduct a preliminary analysis of a complaint and make a report containing recommendations on whether sufficient grounds exist to warrant investigations.
(4) In cases where the complainant alleges that adverse soil impacts are caused by activities originating from another country or countries, the competent authority shall seek consultation with the Minister.

Investigations
(1) The competent authority may, either on its own initiative or upon receipt of information or a complaint from any person, investigate any alleged violation of the Act and/or set of good standards or practices.
(2) Where the competent authority decides not to carry out an investigation, having received a complaint or a request to investigate any alleged violation of the Act and/or set of good standards or practices, the Authority shall, in writing, inform the complainant of the reasons for its decision.

Power to summon and question
(1) The competent authority may, before or during investigations, -
(a) publish a notice in the [Government Gazette] and a newspaper circulating in any area to which the investigation or enquiry relates; and
(b) shall, where practicable, cause any person whose material or pecuniary interests may or will, in the authority's opinion, be involved in, or affected as a result of, such investigation or enquiry to be notified thereof in writing and to be given a reasonable opportunity to make representations to the competent authority concerning the subject matter of such investigations or enquiry.
(2) The competent authority may summon any person who can furnish any information on the subject of an investigation to appear before the competent authority to be questioned or to produce such documentary evidence as, in its opinion, may assist it in such investigation or enquiry.
(3) A person summoned to appear before the competent authority may be assisted at the hearing by any person reasonably acquainted with the facts of the subject of the investigation.

Power to search and seize
The competent authority may, without warrant, enter upon any land or premises to investigate, gather information, take samples, seize, and if necessary, remove from the land or premises for examination and safeguarding, any document or article that has a bearing on the investigation and do all such acts thereon as are necessary for or incidental to the investigation and resolution of an alleged violation of the Act and/or set of good standards or practices.

Decision of the competent authority

(1) The competent authority shall, after conducting its investigations, report in writing its findings and render a decision to the parties.
(2) Without derogating from subsection (1), the competent authority may, at any time before the investigations conclude, conclude an arrangement or agreement for the remediation of the complained violations.
(3) Where the parties have made an arrangement or agreement, such arrangement or agreement shall be presented to the competent authority, which may –
    (a) give or withhold its confirmation; or
    (b) return the matter to the parties, indicating any changes required to the consent agreement or undertaking before the competent authority confirms it.
(4) If the consent agreement has been confirmed, it shall be considered as a final order or decision of the competent authority and shall not be subject to appeal and any person or supplier who does not comply with such order commits an offence and shall be liable, upon conviction, to a fine not exceeding […], or to imprisonment for a term not exceeding […] years, or to both.

PART II - Court proceedings

Institution of proceedings

(1) Any party aggrieved by the competent authority's decision may appeal within 30 days in accordance with the court's procedural rules.
(2) The parties shall adhere to the procedural rules for filing appeals as prescribed in the applicable laws of the competent court.
(3) In any proceedings to which this Act applies, the court shall act expeditiously, without undue regard to technicalities of procedure.

Representation[7]

(1) A party to the proceedings may act in person or be represented by a duly authorised representative.
(2) The court may appoint or make arrangements for the appointment of a qualified legal practitioner to assist the indigents in the proceedings.

4.5. Alternative dispute resolution

The competent court may, on its own motion, or upon the agreement or request of the parties, adopt and implement any appropriate alternative dispute resolution methods, including but not limited to conciliation, mediation, and traditional dispute resolution mechanisms.

This provision permits the use of alternative dispute resolution methods in lieu of litigation. While there are no rigid criteria for determining the appropriate alternative forum or mechanism, several factors may guide the selection of a forum, including: (1) the relationship of the disputants; (2) the nature and number of parties involved in the dispute; (3) the type of relief sought; (4) the financial stakes involved; (5) the significance of expeditiousness and cost-effectiveness; (6) the power dynamics between the parties; and (7) the desirability of establishing principles to govern the resolution of future disputes.

Generally, disputes that are predominantly legal in nature are best resolved through adjudication. Similarly, disputes that present novel or complex issues should be referred to a forum that provides sufficient opportunity to present evidence and arguments comprehensively. Conversely, disputes that centre on non-legal issues, such as cultural values and principles, and those that present more straightforward or routine matters, are more appropriately resolved through non-adjudicatory processes.

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7 Since all countries have specialised or general courts, this provision grants the parties the option to select a court forum in accordance with applicable law. In this context, the term "competent courts" pertains to courts that exercise jurisdiction over natural resources, where applicable, or to courts of general jurisdiction. Further, the existing laws provide for various remedies or reliefs available through the courts, including: (1) interim or permanent preservation orders, including injunctions; (2) prerogative orders; (3) awards of damages; (4) compensation; (5) specific performance; (6) restitution; (7) declarations; and (8) costs. This provision grants access to the courts in person or through a representative, including legal counsel. Considering the costs of hiring lawyers, this provision allows litigants to obtain legal representation from any chosen entity, including non-governmental organisations (NGOs). The appointment of legal representation by the courts for indigent parties is enshrined in the legislative frameworks of most jurisdictions. However, a significant challenge arises because attorneys designated to aid often lack the requisite expertise or specialisation in critical areas such as natural resources management and environmental law. Such attorneys must rapidly familiarise themselves with novel legal concepts and procedural requirements, a process that can prove arduous and time-consuming. Consequently, it is essential to appoint legal counsel with the necessary skills and expertise in the relevant fields of law.

4.6. Transboundary disputes

- Any transboundary soil dispute should, as far as possible, be settled amicably through negotiations, conciliation, or mediation.
- Mutually agreed solutions shall be made publicly available. However, the version disclosed to the public may not contain any information that a disputing party has designated as confidential.
- Where a dispute has not been resolved in a manner as provided for under subsection (1), any disputing party may submit the dispute to any international adjudicating body.

4.7. Traditional institutions

- Subject to existing laws, traditional institutions may resolve a soil dispute arising in their community in accordance with relevant customary law.
- Where a dispute has not been resolved in a manner as provided for under subsection (1), any disputing party may appeal to the relevant court.
- In resolving a dispute under this section, regard shall be given to the relevant customary law and traditional practices of the community where the dispute has arisen.

Most African countries have traditional or customary dispute settlement mechanisms in place. However, the extent to which these mechanisms are used to resolve natural resource disputes varies. Consequently, this provision allows counties with existing traditional institutions to use them. Traditional leaders play a crucial role in preserving and promoting cultural values. Dispute resolution through traditional leaders in customary courts is often preferred due to its accessibility, affordability, and speed. Furthermore, the recognition of traditional institutions fosters the integration of indigenous knowledge.

5. Commentary IV: Data management

Knowledge regarding the condition of soils and landscapes in Africa, and how they are changing over time, is both incomplete and outdated. This data gap is particularly concerning given that Africa's population is projected to double over the next 25 to 30 years, placing immense pressure on the continent's agricultural systems.[8] Therefore, improving soil management, productivity, and sustainability in Africa should be a top priority. Achieving these goals requires the collection and application of accurate, up-

8 See http://www.prb.org, accessed 29 September 2025.

to-date soil and land data to enable evidence-based decision-making and support agricultural productivity, economic development, environmental sustainability, and climate resilience. As emphasised in the World Soil Charter, policymakers must ensure that national soil information systems are developed, maintained, and utilised effectively. Similarly, the 2024 Nairobi Summit on Fertilisers and Soil Health called for the development of standardised and context-specific tools to assess soil fertility, soil health, and soil management. It also urged the deployment of digital information systems to operationalise fertiliser–crop–climate decision support tools at national, regional, and continental levels.

5.1. Challenges

There are several deficiencies and challenges concerning soil data management and outreach. Among the most critical deficiencies that need to be resolved for effective and sustainable management of soils are:

- Many African states lack sufficient soil and land data management infrastructure, including inadequate soil testing laboratories for soil quality assessment and monitoring. As a result, soil data is often outdated or unavailable. If available, soil data frequently lack georeferencing.
- Several African states have established a soil information system (SIS). However, the data and information in these SIS are often incomplete and outdated.
- Only a few African states have developed and published soil maps documenting all the information, particularly for decision-making, including the necessary information for decision-making authorities and entities.
- Many African states lack sufficient human capital, not only in quantitative terms but also in knowledge, expertise, and experience. This applies to trained personnel for collecting, assessing, and disseminating laboratory data.
- Law implementation and enforcement in many African states remain weak, partly due to the lack of clearly defined legal mandates outlining the roles and responsibilities of relevant institutions. This challenge also extends to data management, where legal frameworks often fail to specify the distinct purposes, institutional responsibilities, funding mechanisms, and capacity-building requirements, particularly in relation to training, for effective and coordinated soil data governance.

Further challenges are as follows:

A common understanding of the scope, purposes, and steps of data management is currently lacking. Data management on soil and land consists mainly of three steps. The first step is gathering data, which includes taking local measurements that require extracting the soil and later analysing it. The information could then be used to

determine the current state of the soil in a specific area. The information provided should consider the chemical, physical, and biological properties of soils and should, thereby, address all forms of soil degradation.

Soil data should also include information about current and past soil uses and current (agricultural) practices. Finally, soil data should include information on land tenure and foreign investment.

The second step of data management is the assessment and synthesis of data for different purposes. Skilled personnel are required for this task. The evaluation of soil data could be used for various purposes, *inter alia*:

- Soil health assessments should evaluate the chemical, physical, and biological properties of soil at specific locations to generate reliable, site-specific data.
- This information is essential for developing Environmental Quality Standards (EQS)**.** EQS can define acceptable thresholds of soil degradation. Where such thresholds are exceeded, the level of impact would be deemed unacceptable, and land uses resulting in that exceedance should be legally restricted or prohibited.
- Assessed and synthesised soil data can also support zoning approaches**.** It enables the identification of high-value soils, guiding decisions on land-use planning and the siting of large-scale projects such as infrastructure developments (e.g., buildings, roads, or railways).
- Finally, this information can inform spatial protection measures, helping to designate particularly valuable soils for legal protection through instruments such as conservation zones or soil-protected areas established in land use or environmental planning frameworks.

The third step is disseminating the information to relevant actors, such as policymakers, competent authorities responsible for determining soil uses by granting permissions or deciding on soil zoning or protected areas, and/or farmers. The means of dissemination may vary. Extension services may be the most effective mechanism for informing farmers.

Furthermore, the data and information need to be made accessible to the public, particularly to civil society organisations. To this end, regularly updated soil reports or soil information systems, along with high-resolution soil maps, should be published online and through traditional channels. There are concerns regarding data sharing. Stakeholders regularly express hesitancy to share data due to concerns about how their data could be used and a lack of transparency about attribution. To this end, a legal framework is required. From the perspective of effective data management, competent authorities need the right to access private land to take local measurements.

Incentives for data producers.

Data collection is expensive, and funding is limited. Therefore, some compensation should be granted to those who gathered and provided the data. Data gathering also

serves a purpose, and those using the data could make an economic contribution if this does not hinder access to it.

Ensuring confidentiality and privacy of data.
Confidentiality, data privacy, and data integrity are further challenges that must be considered. Responsibilities within the administration must be determined carefully and clearly. Determining responsibilities is key to establishing a well-functioning system. For various reasons, this determination is never a pure formality.[9]

- The attribution of responsibilities should be cost-effective, rational, and reasonable.
- The division of responsibilities must fit into the existing system of power attribution. Assigning numerous responsibilities to local entities within a centralised system would not be advisable, as they are likely unprepared to handle the tasks.
- The attribution of responsibilities typically corresponds with reputation, influence, and the endowment of human and financial resources. Therefore, the attribution of powers may also create conflicts of interest among various entities.

Generally, it seems rational to request that local authorities conduct the measurements and empower more centralised units to manage the assessment and dissemination process. However, this may vary from country to country.

Data management must be reasonably funded. The entire data management process is time-consuming and labour-intensive, requiring significant investment in modern, advanced equipment. Additionally, data management requires regular updates across data collection and information dissemination. In this context, a fee system needs to be established, again by legal provision, for the use of data by private individuals and entities. Some potential users, such as small-scale farmers, may not be able to afford access to soil and land data.

Use of modern digital means, including AI (Artificial Intelligence), needs to be developed. Digital means are already used broadly. However, modern techniques, including AI, could facilitate the implementation of all data management steps. Data gathering could benefit from modern methods in terms of time and frequency, and improved analytical methods and assessment precision could accelerate data analysis. For data dissemination, AI can be very instrumental, by, among other things, translating scientific information into everyday language, making the information readily available in local languages, and providing more interactive and, thus, more inclusive means of making the information accessible *via* the internet. Maps could be used to make the information more tangible.

9 Ginzky (2022).

Data that could then be published on the internet should include the following categories of information.

- Metadata: Include metadata with explicit data conversions (variables and components), indicating sources for user reference and ownership.
- Soil data: Information on the properties of the soil in a specific location.
- Tenure right information: Information on the rights, including information on foreign investments and their rights to the respective land.
- Multilingual support: Offer translations and audio options in multiple languages to enhance accessibility.
- Weather data integration: Link with weather data to inform agricultural decision-making.
- Fertiliser and pesticide recommendations: Enable data regarding which fertilisers and pesticides to use for specific soil types.
- Outreach, especially to farmers, needs to be improved.

Outreach systems to (small-scale) farmers exist in most African states. However, they are often understaffed and lack sufficient technical and logistical equipment. Outreach services need to be easily accessible to all farmers, including, if possible and appropriate, access via call centres for additional support (development and printing of extension materials; printing of handouts, posters, and production guides; and radio and TV talk shows).

5.2. Options for legal governance mechanisms

This section outlines the preconditions for legal governance mechanisms that extend beyond legal means and the need for specific policies as a foundation for these mechanisms, before analysing the options.

5.2.1. Preconditions for an effective legal governance system for data management and outreach

Legal provisions can influence realities on the ground only if certain preconditions are met. This is particularly true for data management and outreach, as it depends on a capable and effective administration. To operationalise this, the following points need to materialise:

- Sufficient financial funding is required. Otherwise, responsible administrative entities will remain understaffed and lack sufficient technical resources.
- Skilled personnel are required, in terms of expertise but also in terms of number, to fulfil the work-intensive task of data management and outreach.
- Power services and IT infrastructure are needed.

- The use and application of modern digital means, including AI, must be fostered.

5.2.2. Policies and strategies

Nationally agreed policies and strategies should be developed for data management and outreach to jointly determine priorities, mechanisms, and the use of available funds.

- Develop a soil data governance policy, which will make clear what roles are needed for data ownership and management, and what their responsibilities will be. For example, are there existing data managers or stewards for Soil Information Systems (SIS), or is there scope for creating this role? Are there short-term and long-term budgets for these roles? This soil data governance policy should align with the general data governance policies or strategies of most African states. Such plans should also consider existing policies or strategies concerning digitalisation and AI.
- Develop capacity building/succession plans, which entail a concept for developing human capital capable of implementing soil data management and outreach.
- Develop a plan for regular training and awareness on each stakeholder's role in data governance, ensuring they understand their roles and responsibilities and are equipped with the knowledge to maintain high standards in data governance.

5.2.3. Legal governance

As national policies and legislation concerning soil management and outreach differ in content, levels of detail in the regulatory framework, natural and economic conditions, challenges, available resources, and priorities, the following can only provide some insights into aspects that should be clarified by national legislation. Through these clarifications in national law, it can be ensured that national priorities concerning soil data management and outreach are effectively implemented and enforced.

National legislation should clarify the following aspects to establish a reasonable and reliable legislative basis for soil data management and outreach.

- A legal definition of what is meant by "soil data management" is required. This should include the three steps of gathering soil data, assessment, synthesis, transformation, and dissemination of soil data. Furthermore, the legislation should clarify the specific purposes of data management in accordance with

national needs. This is required to explain the purposes for which the soil data could and should be used. Finally, the term "soil data" should be legally defined. By these clarifications, resistance against sharing soil data would be delegitimised.

- The legislation should establish an obligation on the part of landowners and/or those who have rights to land to tolerate soil measurements on their land. This obligation is necessary for soil measurements, which are the basis of soil data management. It must also be valid for foreign investors.
- Most importantly, the legislation must clarify the responsibilities of the administrative entities. The specific division of powers depends on the national administrative system. Thus, the decision concerning the division of powers for soil data management can only be made considering the national specificities.

In general, it is advisable to mandate that local authorities collect soil data. In contrast, soil data assessment, synthesis, and dissemination should be attributed to more central administration entities. Furthermore, it is recommended that the responsibilities of the extension services be clearly defined.

- Legal provisions should also define the means of informing the public. Soil data and information shall be made publicly accessible, either through a soil report or by establishing a soil information system. The law needs to specify the time cycles during which the report and/or the SIS must be updated. Additionally, the law should require the publication and regular update of a soil map with an adequate resolution that includes relevant information in an interactive format.
- The law should also indicate the fees private persons or entities pay for using soil data and information and, if appropriate, determine exemptions from this obligation according to national circumstances. Small-scale farmers, for instance, should primarily be exempt from this obligation.

5.3. Text proposals

As national legal, economic, cultural, and environmental circumstances differ, only a few guidelines for drafting legal texts are presented here.

Definition of "soil data management"

(1) Soil data management entails three processes:
  (a) Soil data gathering, including *in situ* measurements;
  (b) Assessment and synthesis of the soil data; and
  (c) Dissemination of soil data, including making it publicly accessible.
(2) Soil data is defined as it entails the following data and information:

(a) Data on the chemical, physical, and biological properties of soils in a specific location;
(b) Information on the current soil use; and
(c) Information on tenure rights on the relevant land.

(3) The purposes of soil data management are as follows:
(a) Determination of the status quo of soils in a specific location regarding the chemical, physical, and biological properties;
(b) Development and Determination of Environmental quality standards concerning all forms of soil degradation;
(c) Establishment of a soil-protected area; and
(d) Use of the soil data for zoning approaches.

Obligation to tolerate *in situ* measurements
The owner of land or the person or entity that has a right on land has to allow the competent authority in charge to undertake *in situ* measurements of soils on the respective land or mandate a third party to do so.

Division of responsibilities
The responsibilities concerning soil data management pursuant to Section xy shall be as follows: (…)

Information for the general public
Two alternative versions:

Alternative A

(1) A soil report containing all soil data and information shall be published on an internet webpage. It shall be publicly accessible free of cost and updated every five years. Additionally, a high-resolution soil map should be published.
(2) Confidential or private information must not be published or made publicly accessible.

Alternative B

(1) A soil information system entailing a summary of all soil data and information shall be published on an internet webpage. The soil report shall be publicly accessible at no cost and updated every 5 years. Additionally, a high-resolution soil map should be published.
(2) Confidential or private information must not be published or made publicly accessible.

Finally, both options could also be combined:
Fee for use of soil data for private persons or entities

(1) The competent authority will collect fees for using soil data by private persons or entities.

(2) The fee system has to be developed and established by the national authority pursuant to Section 30 (1) of the Model Law.

6. Commentary V: Fertilisers

Efficient fertilisers are crucial for enhancing crop yields while promoting environmental sustainability, primarily by adopting sustainable soil management practices. However, accessibility, affordability, and regional disparities complicate the management of fertilisers across Africa. At the Africa Fertiliser and Soil Health Summit, held in Nairobi in May 2024,[10] the Declaration outlined African nations' significant commitment to addressing the pressing fertiliser issues, particularly facing smallholder farmers. It also outlined ambitious goals to triple domestic production and distribute certified organic and inorganic fertilisers by 2034.

According to the International Standard ISO 7851, inorganic fertilisers are defined as fertilisers containing declared nutrients in the form of inorganic salts obtained through extraction or industrial processes.[11] Organic fertilisers are residues from plants, animals, humans, and various industrial wastes. Key actions of the Nairobi Declaration include prioritising local production and blending of mineral fertilisers, revitalising the African Centre for Fertiliser Development in Harare, Zimbabwe, and promoting decentralised, low-carbon fertiliser production methods.

Additionally, the Summit aimed to provide targeted agronomic recommendations to 70% of smallholder farmers by 2034, leveraging digital tools for efficient soil management and nutrient stewardship. These efforts are set to enhance policy frameworks, improve fertiliser accessibility, and build institutional capacity across the continent for sustainable soil health management. This Commentary examines the complexities of fertiliser governance in Africa and outlines mechanisms to promote the responsible and sustainable use of fertilisers. It explores regulatory frameworks, enforcement policies, and complementary strategies. It aims to provide actionable recommendations to enhance fertiliser policies in Africa to support sustainable soil management.

6.1. Challenges

Multiple challenges hinder the effective and efficient use of fertilisers in Africa, hindering their potential to boost crop yields and ensure food security. Those

10 See https://au.int/en/AFSH-2024, accessed 29 September 2025.
11 See https://www.iso.org/standard/77570.html, accessed 29 September 2025.

challenges include limited access, affordability issues, low adoption rates, limited knowledge, environmental concerns, and poor governance.

6.1.1. Limited accessibility

6.1.1.1. Inorganic fertilisers

Many African farmers, particularly smallholders, struggle to access inorganic fertilisers due to weak distribution networks, inadequate infrastructure, and inefficient supply chains. Rural areas often lack reliable transportation and storage facilities, leading to inconsistent availability of fertilisers.[12] Due to various reasons, including high import costs, poor economies of scale, and inefficient subsidy programs, fertiliser prices in Africa are among the highest globally.[13] Since many African countries depend on imported fertilisers, they face fluctuating international prices and high transportation costs. The limited local production capacity exacerbates this issue, making fertilisers unaffordable for smallholder farmers. Although governments provide fertiliser subsidies, these programs often suffer from inefficiencies, corruption, and poor targeting, leaving many farmers unable to benefit.

6.1.1.2. Organic fertilisers

Although organic fertilisers can be produced locally, they may not be accessible to farmers due to various logistical, technical, and economic constraints, as well as ethical considerations. Establishing a national production system for organic fertilisers in Africa presents numerous challenges that hinder its widespread adoption and effectiveness. One major constraint is the limited availability of raw materials such as animal manure, crop residues, and compost, which are often used for other purposes, such as fuel or animal feed,[14] reducing their availability for fertiliser production. Additionally, high production costs pose a significant barrier, as processing organic fertilisers requires substantial investment in labour, infrastructure, and technology, which small-scale producers often lack. The lack of quality control standards and incentives discourages investment in the organic fertiliser industry. Weak supply chains and poor rural infrastructure further complicate access, making it challenging to distribute organic fertilisers efficiently from production sites to farmers. Technological gaps and limited research further hinder the optimisation of organic

12 Klutse et al. (2018).
13 Amankwah et al. (2024).
14 See https://www.ipcc.ch/srccl/, chapter 4.

fertiliser production, while market constraints, such as higher costs and unstable demand, make organic options less competitive.

6.1.2. Lack of knowledge

Many farmers lack knowledge about the proper application of inorganic fertilisers, leading to inefficient use and potential soil degradation. Extension services that provide training on best fertiliser practices are often inadequate or underfunded in many African countries.[15] Farmers may overuse, underuse, or misapply fertilisers without proper guidance, reducing their effectiveness and leading to economic losses and soil degradation. The lack of awareness and education among farmers about the benefits and applications of organic fertilisers results in their slow adoption, especially when they are perceived as less effective than synthetic fertilisers. Furthermore, there is a lack of soil testing and tailored fertiliser recommendations, resulting in farmers often using fertilisers that do not match their soil and crop needs, thereby limiting their benefits. The lack of knowledge and the effects of climate change, such as irregular rainfall and rising temperatures, may significantly impact fertiliser efficiency and agricultural outcomes.

6.1.3. Environmental concerns

Overusing or misusing chemical fertilisers can contribute to soil degradation, nutrient imbalances, and environmental pollution, particularly where proper soil testing and management practices are not followed. Excessive fertiliser application, whether inorganic or organic, can also lead to water pollution through runoff, which in turn affects aquatic ecosystems.[16] In contrast, underusing fertilisers can deplete soil nutrients, leading to declining soil fertility.[17] Sustainable fertiliser management practices, including integrated soil fertility management,[18] are not widely adopted due to insufficient awareness, limited policy support, and limited access to fertilisers, including organic fertilisers.

15 Agwu et al. (2023).
16 Craswell (2021).
17 Dimkpa (2023).
18 Vanlauwe et al. (2010); See https://www.ipcc.ch/srccl/chapter/chapter-4/, accessed 7 April 2026.

6.1.4. Governance deficiencies

Weak regulatory frameworks and inconsistent policies for fertiliser production, importation, and distribution hinder market stability. Corruption, mismanagement of subsidy programs, and a lack of harmonised regulations among African nations further exacerbate the problem. Many countries lack strong enforcement mechanisms to ensure the quality of fertilisers sold in the market, leading to the proliferation of counterfeit and substandard products. Furthermore, regional trade barriers and inconsistent taxation policies increase costs and hinder the efficient cross-border distribution of fertilisers. Particularly for organic fertilisers, poor governance in waste management practices can also reduce the availability of raw materials. In contrast, government subsidies for synthetic fertilisers create an uneven playing field, favouring chemical options over organic alternatives. Furthermore, inadequate investment in research and development and limited collaboration among key stakeholders restrict innovation in the sector.

6.2. Options for legal governance mechanisms, including explanatory notes

Effective legal governance mechanisms are crucial for regulating the production, distribution, and use of fertilisers in Africa. A well-structured legal framework ensures that fertilisers are accessible, affordable, and used sustainably while minimising negative environmental and economic impacts. African governments can implement regulatory measures tailored to local specificities and Sustainable Development Goals (SDGs) to enhance fertiliser management. These policies could address key challenges in improving fertiliser management in Africa, including accessibility, affordability, quality control, and environmental impact.

6.2.1. Improving accessibility and affordability

The key options for improving accessibility and affordability of fertilisers in Africa involve:

(1) Subsidy programs and financial incentives to reduce costs and improve purchasing power. A digital platform for transparency and efficiency can manage this.
(2) Private sector involvement in fertiliser production and distribution, and implementing public-private partnerships.
(3) Investment in infrastructure development to ensure widespread access to affordable fertilisers across African countries and the development of agro-dealer networks.

(4) Promote sustainable organic waste collection, including crop residues, animal manure, and food waste, while encouraging composting, vermiculture programs, and waste management policies that prioritise agricultural and biodegradable waste for organic fertiliser production at the national level.

Fertiliser accessibility is key to improving agricultural productivity, particularly for smallholder farmers who often face financial constraints. Subsidy programs and financial incentives help address this challenge by reducing costs and increasing farmers' purchasing power. Smart subsidies, such as direct input subsidies (where governments provide fertilisers at a reduced price) and voucher-based systems (where farmers receive vouchers to exchange for fertilisers at authorised suppliers), ensure that assistance reaches those in need while minimising inefficiencies and corruption. To maximise effectiveness, subsidy and incentive programs should be designed to avoid long-term dependency, foster private-sector participation, and align with national agricultural policies to ensure sustainable resource allocation.

Beyond government support, private sector involvement is essential in fertiliser production and distribution. However, regulatory frameworks must be in place to guarantee fair pricing, product quality, and environmental sustainability. Encouraging public-private partnerships can further support local fertiliser manufacturing.

Infrastructure development is crucial to ensuring efficient fertiliser distribution. Investments in transportation and storage facilities help reduce logistical costs, making fertilisers more affordable for farmers in rural areas. Developing agro-dealer networks also improves last-mile distribution, ensuring fertilisers are available when and where needed.

Promoting sustainable organic waste collection at the national level is crucial for developing an efficient organic fertiliser production system. This involves waste management policies that prioritise recycling biodegradable waste, support a circular economy, decrease reliance on synthetic fertilisers, and improve soil health. Effective implementation requires coordinated efforts from government agencies, private-sector actors, and local communities to establish collection networks, processing facilities, and quality standards, thereby contributing to sustainable and climate-smart agriculture.

6.2.2. Improving quality control

The following options can be considered for improving the quality control of fertilisers:

(1) Implementation of comprehensive legal frameworks governing fertiliser production.

(2) Compliance is enforced through certification processes and periodic inspections.
(3) Harmonising regulations through regional economic blocs to facilitate cross-border trade while preventing the proliferation of counterfeit fertilisers.

Fertiliser quality, safety, and availability are critical for agricultural productivity and food security. Without proper regulations, markets can be flooded with counterfeit or substandard products that harm soil health and reduce crop yields. Governments play a crucial role in establishing legal frameworks that ensure fertilisers meet national and international standards. Effective regulations should cover fertiliser production, importation, distribution, and usage. This includes licensing requirements for manufacturers and importers, marketing regulations to ensure transparency, and compliance measures to prevent market distortions.

Strong enforcement mechanisms, including regular inspections, penalties for violations, and collaboration with law enforcement agencies, are crucial for maintaining compliance. A robust certification system is necessary to guarantee that only high-quality fertilisers enter the market. Certified laboratories assess fertilisers for chemical composition, effectiveness, and environmental impact before approval.

Harmonised regulations across national and regional levels help streamline fertiliser trade and ensure uniform quality standards. Regional economic blocs, such as the Economic Community of West African States (ECOWAS) and the Common Market for Eastern and Southern Africa (COMESA), facilitate cross-border trade by reducing regulatory discrepancies among member states. This enhances market efficiency and prevents counterfeit fertilisers from being circulated across borders.

6.2.3. Reducing environmental impacts

Several options are possible to reduce the environmental impacts of fertilisers. The following options are possible:

(1) Implementing legal, governance, monitoring, and evaluation mechanisms ensures policy effectiveness.
(2) Encourage scientific research to refine fertiliser recommendations based on empirical data.

A strong legal and governance structure is essential for regulating fertiliser production, distribution, and use while balancing agricultural productivity with environmental protection. Governments must establish clear laws and policies to ensure the responsible management of fertilisers. Laws should mandate soil testing before fertiliser application to prevent overuse and degradation. Policies promoting Integrated Soil Fertility Management, which combines organic and inorganic fertilisers, ensure

efficient nutrient use and soil conservation. A decentralised governance system allows local authorities to tailor policies to their needs. Regulations should enforce buffer zones near water bodies to prevent runoff, limit excessive fertiliser application, and penalise non-compliance. These measures protect ecosystems and maintain soil health. Regular audits, compliance reporting, and field surveys ensure fertiliser policies achieve their objectives.

Scientific research supports evidence-based policymaking, refining recommendations based on real-world data. This allows governments to adjust regulations to improve efficiency and minimise negative impacts. It helps create customised fertiliser recommendations tailored to specific soil and crop needs. This reduces environmental risks and promotes efficient fertiliser use, preventing nutrient imbalances that can harm soil and water resources. Research evidence is also needed for organic fertilisers, precision agriculture, and ISFM, which can optimise fertiliser efficiency and minimise environmental impact.

6.3. Concrete text for legal provisions

This proposal is intended as a point for consideration and must be tailored to the country's national needs and legislative framework. It outlines a potential approach to formulating a law that regulates the core elements of fertiliser governance.

General Provisions

Objective
This law regulates the production, distribution, and use of fertilisers to enhance agricultural productivity while ensuring environmental sustainability, maintaining soil health, and protecting farmers.

Scope
This law applies to all entities that manufacture, import, distribute, sell, and use fertilisers within the national territory.

Definitions:
"Fertiliser" refers to any substance containing one or more recognised plant nutrients used to promote plant growth;
"Integrated Soil Fertility Management (ISFM)" refers to the combined use of mineral fertilisers, organic inputs, and soil conservation practices to optimise agricultural productivity sustainably;
"Certification Authority" refers to the designated national body responsible for fertiliser quality control and compliance enforcement.

Accessibility and Affordability

(1) The government shall implement targeted subsidy programs to support smallholder farmers, ensuring affordability and access through transparent mechanisms such as digital vouchers and direct input subsidies. The competent authority shall oversee distribution and conduct periodic reviews.
(2) The state shall encourage private sector participation in local fertiliser production through investment incentives and regulatory support. Public-private partnerships shall be established to enhance domestic manufacturing and distribution while ensuring transparent pricing and compliance with environmental regulations.
(3) The government shall invest in transportation and storage infrastructure to improve distribution efficiency and promote agro-dealer networks for last-mile accessibility. A monitoring system shall track fertiliser availability to prevent supply chain disruptions.
(4) The government shall establish a national framework for systematically collecting, processing, and recycling biodegradable waste in collaboration with private sector stakeholders and local communities to support organic fertiliser production.

Quality Control and Standards

(1) All fertiliser manufacturers and importers must obtain a licence from the Certification Authority before commercial operations. Imported fertilisers must meet national and international quality standards and undergo mandatory laboratory testing. Counterfeit and substandard fertilisers are prohibited.
(2) All fertilisers must undergo quality certification before market introduction. National regulatory agencies shall conduct periodic inspections, and testing laboratories shall assess fertilisers for composition, effectiveness, and environmental impact.
(3) The government shall collaborate with regional economic blocs to harmonise fertiliser quality standards and ensure mutual recognition of cross-border trade requirements.

Environmental Protection and Sustainability

(1) Runoff and Pollution Control. Fertiliser application must adhere to environmental guidelines to minimise soil and water pollution. Buffer zones shall be maintained near water bodies, and violations shall result in fines, suspension of business licences, or criminal liability.
(2) Farmers must conduct soil testing before applying fertilisers. The competent authority shall provide crop- and region-specific recommendations, and extension services shall train farmers on best practices.

(3) The government shall promote organic fertilisers and precision agriculture while supporting ISFM. Research institutions should develop innovative and environmentally friendly fertiliser solutions.

Monitoring, Enforcement, and Penalties

(1) A national system shall track fertiliser production, distribution, and usage. Annual reports will assess policy impact, and stakeholder engagement will ensure regulatory improvements.
(2) Entities distributing counterfeit or substandard fertilisers shall face fines and/or imprisonment. Environmental violations, excessive fertiliser use, and pollution shall result in penalties, including the suspension of business operations and mandatory remediation. Repeat offenders may face increased fines and licence revocation.
(3) Farmers and consumers may report grievances to the Certification Authority. Disputes shall be resolved through arbitration before legal proceedings. A Fertiliser Regulatory Tribunal shall handle disputes and ensure fair enforcement of regulations.

7. Commentary VI: Foreign investment

Foreign Direct Investment (FDI) plays a crucial role in supporting economic development across Africa, prompting many countries to actively promote it. However, this must be carefully balanced against the host state's sovereign right to regulate its natural resources, including land and soil. The legal framework governing investment and soil protection is complex, shaped by a patchwork of national laws, inconsistencies in implementation, and growing international influence. This complexity is further compounded by the involvement of numerous stakeholders—governments, NGOs, private investors, and global organisations—leading to significant coordination challenges. In many cases, soil degradation is linked to agricultural investments that lack specific legal or regulatory safeguards for soil health. To address this, the legal framework for FDI must be revised to promote responsible investment practices that align with sustainable soil management objectives.

African states regulate investor conduct through both civil and criminal law frameworks, covering areas such as taxation, licensing, and environmental impact assessments. However, the broader legal landscape governing FDI is highly fragmented, comprising international, transnational, national, and contractual rules. Many older Bilateral Investment Treaties (BITs) disproportionately emphasise investor protection, often at the expense of imposing clear obligations, particularly regarding environmental and soil protection. In response, several African states are now revising their investment treaties to better balance investors' rights with their

corresponding duties. In addition to treaty reforms, national investment laws and state–investor contracts also play a critical role in shaping investor responsibilities and ensuring alignment with sustainable development objectives.

This Commentary examines the legal texts governing the relationship between investors and host states, focusing on investors' obligations regarding environmental protection and soil conservation.

7.1. Description of the challenges of foreign investment and soil protection in Africa

A key challenge in addressing the environmental and soil-related impacts of foreign investment in Africa lies in the diversity of the legal landscape, which draws from both domestic and international sources. National laws can play a critical role by designating strategic sectors and mandating investor conduct in line with the Sustainable Development Goals (SDGs). Investment codes and sector-specific legislation increasingly impose direct obligations or conditions on investors. For example, Mozambique's 2018 investment law requires compliance with national standards on taxation, labour safety, and environmental protection. Egypt permits investors to contribute voluntarily to social development initiatives, while Ethiopia's legal framework encourages socially and environmentally responsible investment. Similarly, Morocco's new investment charter explicitly highlights sustainable development as a guiding principle.

African legal systems are diverse and influenced by civil law, common law, Islamic law, or a mix of these. Customary law also plays a significant role, particularly in land access, as seen in Zambia, where traditional chiefs administer most of the land. Land access for foreign investors is often restricted, requiring local partnerships (Nigeria), leases (Ethiopia), or limited private leases (South Sudan).

International legal instruments, particularly BITs, also play a significant role in regulating foreign investment. These treaties establish binding international obligations, meaning that government actions lawful under domestic law may still constitute a breach of treaty commitments. Liberia adopts a different approach, relying primarily on investment contracts rather than BITs to govern its foreign investment relationships.

Contracts allow host states to achieve specific objectives in sectors such as infrastructure and mining. Still, investors often prefer alternative jurisdictions or stabilisation clauses due to perceived instability in host state laws.

African nations are developing a new model for investment promotion and development agreements, emphasising balance and responsible investment. The 2016 Nigeria-Morocco treaty, for instance, has been commended for its focus on sustainable development.

Africa's regional investment landscape is shaped by a range of bilateral and regional treaties, reflecting the continent's legal and institutional diversity. These include:

- The 1990 Arab Maghreb Union Investment Agreement, which is still not yet in force.
- The 2007 Common Market for Eastern and Southern Africa (COMESA) Investment Agreement (COMESA Protocol), intended to be replaced by the revised COMESA Common Investment Area (CCIA) Agreement, which is also not yet in force.
- The 2018 Economic Community of West African States (ECOWAS) Supplementary Act on the Common Investment Code, which is in force and complements the 2008 ECOWAS Competition Rules.
- The 2006 Southern African Development Community (SADC) Protocol on Finance and Investment, as amended by the 2016 Agreement, which is currently in force.

Additionally, African states participate in broader regional initiatives:

- The 1980 and 2013 Unified Agreements for Arab Capital Investment (Arab League).
- The 1981 Agreement on Promotion, Protection and Guarantee of Investments amongst the Member States of the Organisation of the Islamic Conference (OIC).

Despite these efforts, the African investment regime remains fragmented. Key points to consider include:

- South Africa has reformed its investment policy, terminating several BITs.
- Liberia favours investment contracts over international treaties, which can pose risks for investors due to the application of host state law.

In summary, while there is a push for more balanced and sustainable investment agreements, the African investment framework remains complex and fragmented, characterised by regional and bilateral agreements and differing national approaches.

Unlike regional treaties, intra-African BITs often lack a strong focus on sustainable development. While approximately 20 African countries are parties to two regional African investment treaties, eight are parties to only one, and Libya is a party to four. Notably, five countries—Equatorial Guinea, the Central African Republic, the Republic of Congo, São Tomé and Principe, and South Sudan—are not party to such agreements.

Two key legal instruments stand out for their provisions on environmental protection and sustainable development: the AfCFTA Investment Protocol and the ECOWAS Investment Code. It is essential to note that the AfCFTA Investment Protocol has not yet entered into force because the African Union (AU) has not adopted its annexes.

The AfCFTA Investment Protocol has the potential to reshape investment rules across the continent, prioritising sustainable development alongside investment protection. It covers all 55 AU member states and acknowledges the host state's right to regulate services and to introduce new regulations for legitimate policy objectives, including environmental protection and sustainable development. Article 3 explicitly promotes sustainable development in line with the SDGs. The AfCFTA's protocols, such as the Protocol on Trade in Goods, also include environmental safeguards, allowing states to adopt measures for human, animal, and plant health, as reinforced by Article 26.

The ECOWAS Investment Code dedicates Chapter 6 (Articles 21-29) to provisions related to environmental and sustainable development. Article 21 outlines general provisions for environmental protection. It reaffirms member states' commitment to promoting sustainable investment policies that advance environmental protection, encourage high environmental protection standards, facilitate the effective implementation of national environmental laws, and enhance member states' capacity to address investment-related environmental issues through regional cooperation.

The code defines "environmental legislation" as any member state law or provision whose primary objective is to protect the environment or prevent harm to human, animal, or plant life or health, through:

- Preventing, reducing, or controlling the release of pollutants.
- Controlling hazardous chemicals and waste.
- Protecting wildlife and natural habitats.
- Implementing relevant environmental agreements.

It also emphasises that encouraging investment by relaxing national health, safety, or environmental measures is illegal.

Article 22 of the ECOWAS Investment Code recognises the importance of coherent investment, trade, and environmental policies in enhancing environmental protection and promoting sustainable economic development. It affirms the sovereign right of member states to establish their own environmental protection levels and policies, while also committing them to maintaining and improving high environmental protection standards.

Article 27 of the ECOWAS Investment Code outlines the environmental obligations of investors, requiring them to:

- Conduct business in strict accordance with national environmental laws, regulations, administrative practices, and applicable multilateral agreements.
- Perform mandatory environmental and social impact assessments before undertaking business activities and investments.
- Apply the precautionary principle in environmental and social impact assessments and investment decisions.
- Make environmental and social impact assessments publicly accessible to affected communities and stakeholders.

- Restore environmental damage using appropriate technologies and provide compensation to affected parties.
- Provide relevant environmental information to national environmental authorities.
- Implement waste production and disposal standards equivalent to or stricter than those in their home countries.

Furthermore, Article 29 of the Code introduces innovative obligations, requiring investors to take measures to:

- Increase resource efficiency, including recycling and waste reduction.
- Develop and implement methodologies for integrating environmental costs into accounting and pricing mechanisms.
- Adopt global sustainable development policies and ensure environmentally sound technologies are accessible to subsidiaries within member states, including using environmental audits.
- Establish partnerships with SMEs to facilitate knowledge exchange in management skills, market development, and technological expertise.
- Increase national and global research and development in environmentally sound technologies and environmental management systems.
- Ensure responsible and ethical product and process management, considering environmental aspects.
- Adopt and implement production and hazardous waste disposal standards equivalent to or stricter than those in their home countries, including impact assessments on local resources and health risks.
- Prepare emergency plans for environmental damage prevention and mitigation.

The ECOWAS Investment Code and the AfCFTA Investment Protocol promote responsible investment and impose significant obligations on member states and investors. However, the effective implementation of these obligations remains a separate and crucial challenge, since most African countries' systems adopt a dualistic approach, which implies the juxtaposition of the international and domestic legal orders. Consequently, international treaties and conventions may apply in the state's legal order only from their transposition into domestic legislation, in accordance with the procedure laid down for that purpose in that legislation, which may differ from one country to another. For example, the Moroccan Constitution provides in its preamble that it grants international conventions duly ratified and published by the state primacy over the domestic law of the country, and that the state must harmonise the relevant provisions of its national legislation; nevertheless, these conventions and agreements must respect the immutable national identity of the state. In most African countries, the provisions of international agreements must be transposed to be applied.

7.2. Governance

It is crucial to distinguish between investment governance within a state's domestic legal order and that under bilateral or multilateral agreements governing foreign investment.

Regarding domestic law, foreign investment is a cross-cutting issue that involves multiple institutions and administrations. Therefore, a coordinating body for public policy in this sector that engages all stakeholders is essential. In Morocco, for instance, the Moroccan Agency for Investment and Export Development (AMDIE), established in 2017, fulfils this role. AMDIE, a public entity with legal personality and financial autonomy, implements the national strategy to develop, incentivise, and promote domestic and foreign investments and exports. AMDIE's responsibilities include:

- Proposing and analysing strategies to achieve government investment and export development objectives and evaluating results.
- Providing opinions on investment and export promotion matters.
- Serving as the secretariat for the National Investment Commission (CNI).

In addition to AMDIE's national role, Regional Investment Centres (CRIs) support foreign investment at the regional level. These centres support regional investors and serve as the initial point of contact for investment projects. CRIs, under the supervision of the Head of Government (delegating some authority to the MICEPP), are public entities across Morocco's twelve regions, offering services such as:

- Information and guidance on regional investment opportunities and administrative procedures.
- Personalised support for project development, from planning to implementation.
- Post-investment support for business startups and growth.
- Acting as a mediator for investor-administration disputes.

The governance of bilateral or multilateral agreements (such as FTAs, BITs, and IPAs) typically includes governance mechanisms within their provisions. For example, Article 9 of the AfCFTA establishes an institutional framework for its implementation, including bodies for administration, facilitation, implementation, and monitoring. The AfCFTA's governance structure comprises:

- The Conference;
- The Council of Ministers;
- The Committee of Senior Trade Officials; and
- The Secretariat.

Title Three of the AfCFTA Agreement outlines the administration and organisation of the Free Trade Area. The Conference of the Member States provides oversight and strategic guidance on the AfCFTA's operations, including the action plan to boost intra-African trade. All decisions must be made by consensus, establishing a

hierarchical structure among the bodies. Specifically, the Committee of Senior Trade Officials refers issues that lack attainable consensus to the Council of Ministers for review. The Council of Ministers, in turn, refers unresolved matters to the Conference (Article 14 of the Agreement). Article 11 of the Agreement details the composition and functions of the Council of Ministers, while Article 12 specifies the composition and functions of the Committee of Senior Trade Officials.

7.3. Options for legal governance mechanisms

A multifaceted approach to legal governance is essential for addressing the challenges of soil protection in Africa in the context of foreign investment. The following are options for legal governance mechanisms that can be implemented:

Integration of soil protection into investment laws and policies:

- Mechanism: Amend or develop national investment codes and policies to explicitly incorporate soil protection standards and requirements.
- Purpose: Ensure that soil health is a fundamental consideration in all foreign investment projects.
- Implementation: Requires collaboration between investment promotion agencies, environmental authorities, and legal experts.

Strengthening Environmental Impact Assessment (EIA) frameworks:

- Mechanism: Enact or reinforce laws mandating comprehensive EIAs, including detailed soil impact assessments for all relevant foreign investment projects.
- Purpose: Identify, evaluate, and mitigate potential soil degradation risks from investment activities.
- Implementation: Establish clear EIA guidelines, competent assessment bodies, and public participation mechanisms.

Land use planning and zoning regulations:

- Mechanism: Develop and enforce land use planning and zoning regulations that designate areas for specific investment activities, considering soil sensitivity and ecological vulnerability.
- Purpose: Prevent incompatible land uses, control urban sprawl, and protect fertile agricultural lands.
- Implementation: Strong local government capacity, spatial planning expertise, and community involvement are required.

Contractual agreements and investment treaties:

- Mechanism: Incorporate soil protection clauses into investment contracts and bilateral/multilateral treaties (BITs/MITs).
- Purpose: Set clear environmental obligations for foreign investors and establish dispute resolution mechanisms for soil-related issues.
- Implementation: Requires careful drafting of contract terms and negotiation of treaty provisions that balance investor rights with environmental responsibilities.

Regulatory frameworks for specific sectors:

- Mechanism: Develop sector-specific regulations for agriculture, mining, and infrastructure development, with detailed provisions for soil conservation and rehabilitation.
- Purpose: Address the unique soil degradation risks associated with each sector.
- Implementation: Requires technical expertise, stakeholder consultation, and effective monitoring and enforcement.

Community participation and empowerment:

- Mechanism: Establish legal mechanisms for community participation in land use planning, environmental monitoring, and enforcement of soil protection laws.
- Purpose: Enhance local ownership, promote sustainable land management practices, and ensure environmental policies reflect community needs and priorities.
- Implementation: Requires capacity building for community organisations and access to information.

7.4. Proposed legal framework modifications

Significant legal reforms are necessary to ensure sustainable foreign investment that respects the environment and protects soil integrity. These reforms should target domestic African legislation related to foreign investment, as well as international instruments, particularly BITs/MITs. The latter presents a greater challenge, as negotiations often prioritise economic interests over ecological concerns.

To safeguard the host state's environment, African nations must revise their existing BITs to better balance investor rights and obligations. New BITs should incorporate the following elements:

- The contribution of foreign investment to sustainable development.
- The host state's right to regulate in the public interest.

- Updated definitions for key terms such as investment, investor, fair and equitable treatment, expropriation (including indirect), national treatment, and most-favoured-nation treatment.
- The imposition of specific obligations on foreign investors operating within the host state.
- Facilitating investment through joint committees for agreement implementation and national focal points for investor communication.

These updated BITs should promote economic cooperation centred on sustainable investment, encompassing economic, social, and environmental dimensions. They should explicitly define investor obligations regarding social and environmental responsibility, including contributions to the host state's sustainable development through responsible practices, as well as compliance with human rights, labour standards, responsible business conduct, and environmental protection.

The following are concrete examples of legal provisions that could be included in legislation or investment treaties to address the challenges of soil protection associated with foreign investment in Africa. These provisions aim to strike a balance between investment promotion and environmental sustainability.

Environmental Impact Assessments (EIAs) and due diligence:

(1) All foreign investments exceeding [specified threshold] in sectors impacting land use, including but not limited to agriculture, mining, and infrastructure development, shall be subject to a mandatory, comprehensive, and publicly accessible Environmental and Social Impact Assessment (ESIA) before project commencement. The ESIA shall include a detailed soil impact assessment, outlining mitigation measures for potential degradation.
(2) Foreign investors shall conduct thorough environmental due diligence, encompassing soil health assessments, before acquiring land or commencing operations. This due diligence shall be documented and submitted to the relevant environmental authority for review.

Soil conservation and sustainable land management:

(1) Foreign investors in agricultural projects shall implement sustainable land management practices, including but not limited to minimum tillage, crop rotation, and integrated nutrient management, to prevent soil erosion and maintain soil fertility. A soil management plan shall be integrated into the project's operational plan.
(2) Mining operations by foreign investors shall include mandatory soil restoration and rehabilitation plans, ensuring the restoration of topsoil and vegetation to pre-mining conditions. Financial guarantees shall be provided to ensure compliance.

(3) Foreign investment projects that will lead to deforestation must have a clear reforestation program and ensure that the soil quality of the reforested land is monitored for at least ten (10) years.

Investor obligations and environmental responsibility:

(1) Foreign investors shall adhere to the host state's environmental laws and regulations, including those related to soil protection, waste management, and water resources. Any deviation from these laws shall result in penalties, including fines and project suspension.
(2) Foreign investors shall adopt and implement best environmental practices and technologies, including soil conservation measures, to minimise their environmental footprint. They shall also provide regular environmental performance reports to the relevant authorities.
(3) Foreign investors are obligated to contribute to local community development, including restoring environmental damages that their activities caused. They are also obligated to provide environmental training for the local workers.

Transparency and public participation:

(1) All environmental impact assessments, soil management plans, and environmental performance reports related to foreign investment projects shall be publicly available. Public consultations shall be conducted to gather input from affected communities.
(2) Local communities shall have the right to monitor and report environmental violations by foreign investors. A transparent and accessible complaints mechanism shall be established.

Dispute resolution and environmental safeguards:

(1) Investment treaties shall include provisions that explicitly recognise the host state's right to regulate in the public interest, including protecting soil and land resources. Dispute resolution mechanisms shall consider the environmental impacts of investment projects.
(2) Any dispute relating to environmental damages, or soil degradation caused by a foreign investor, will be handled by the host state's courts, and according to the host state's environmental law.

Incentives for sustainable investment:

(1) Foreign investors who implement sustainable land management practices and invest in soil restoration technologies shall be eligible for tax incentives and other benefits.

(2) Priority shall be given to foreign investment projects demonstrating a commitment to environmental protection and contributing to the host state's sustainable development goals.

These provisions aim to create a legal framework that promotes responsible foreign investment while safeguarding Africa's valuable soil resources.

8. Commentary VII: Gender equality and equity

Many African countries have undertaken legal reforms to promote gender equality and create a more enabling environment for women's effective participation in national economies. Within the African human rights framework, the Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol) affirms women's rights to land and environmental resources. Article 15 explicitly links the right to land with the right to food security, highlighting the fundamental importance of soil resources to agriculture in Africa. Article 19 further obliges State Parties to promote women's access to and control over productive resources, including land, and to guarantee their property rights.

Similarly, the New Partnership for Africa's Development (NEPAD) Environment Action Plan recognises the critical role of women in environmental management and calls for their full participation in environmental decision-making processes. Despite these policy and legal advancements, however, gender disparities remain entrenched. Women continue to face disproportionate vulnerability to the impacts of climate change and land degradation, and to exclusion from decision-making processes in Sustainable Soil Management (SSM). Although women are central to soil-dependent livelihoods, many SSM initiatives fail to incorporate gender parity, thereby undermining both equity and environmental sustainability. This Commentary explores these persistent gaps and considers their implications for more inclusive and effective soil governance across Africa.

8.1. Description of challenges

Some of the challenges that impede women's effective participation in SSM include:

- Laws, policies, and decision-making processes often overlook gender issues and women's rights, particularly in matters related to poverty eradication, environmental degradation, soil management, market access, and economic development. Even in countries with gender-sensitive laws, weak implementation remains a significant challenge.

- Women in African countries generally lack access to, control over, and ownership of land and environmental resources, which are closely linked, such as soil, food, fuel, timber, water, and genetic resources. The roles of traditional authorities in allocating land resources within communal land complicate efforts to enforce equity and gender equality in land distribution. Due to insecure land access, women are frequently relegated to marginal, lower-quality, and remote areas, where sustaining healthy soils and ensuring ecosystem services remain particularly difficult.
- Additionally, women farmers lack access to cash and/or credit facilities, technical support, and information to enable them to implement sustainable soil health practices. Gender-neutral laws (laws using 'they/them' to refer to both men and women) on land and environmental resources have not led to an increase in women owning these resources due to structural barriers, such as limited access to credit, and the prevalence of the myth that women are not entitled to own land.[19]
- Despite women's significant involvement in agriculture and food security initiatives across Africa, they remain underrepresented in institutions managing land and environmental issues. Women are significantly underrepresented in policy formulation and decision-making processes related to natural resource management, conservation, protection, and rehabilitation. In patriarchal systems, this exclusion extends to family-level decisions on land use and soil management, where women's knowledge and interests are often overlooked in development planning.
- Soil erosion and environmental degradation have severe impacts on the African populace, but more so on the lives and roles of women and girls. As a result, economic stress within households and dependency on scarce resources are compounded.
- In most countries in Africa, women's roles and contributions to agriculture and soil-related activities are identified according to the limited soil data available, thereby making it difficult to fully capture the exact role, contribution, and challenges faced by women in SSM.
- In conclusion, women in many African countries face a range of interconnected obstacles that hinder their effective participation in SSM. These include limited and insecure land rights, restricted access to land and natural resources, often of lower quality or smaller size, and exclusion from decision-making processes at local and national levels. Women also frequently lack the financial capital needed to access production inputs and are denied access to soil-related knowledge and training, mainly due to patriarchal norms and socially imposed roles that confine them to caregiving responsibilities

19 Kameri-Mbote (2007).

within their communities. Addressing these systemic barriers is essential to achieving equitable, effective, and sustainable soil governance in Africa.

8.2. Options for legal governance mechanisms

To effectively address these challenges, women and girls must be recognised and included as key stakeholders in gender-responsive interventions, whether projects, programmes, policies, or strategies, that are tailored to the specific needs and priorities of both women and men. Their active participation is essential to ensuring equitable engagement, influence, and benefit-sharing across all SSM initiatives.

Furthermore, identifying effective governance options to advance gender equality while promoting soil health requires an in-depth analysis of the complex interlinkages between SSM and gender dynamics. These relationships are influenced by a diverse array of economic, social, cultural, educational, and political factors that vary significantly across national and local contexts. Some of the proposed options include:

- Design or improve national soil management and supportive agricultural and environmental legal frameworks to be more gender sensitive.
- Design and implement inclusive and gender-responsive education and extension programmes. This can be achieved by strengthening the linkages among women's land rights, development, and sustainability, which are often neglected across much of Africa.
- Ensure inclusion of men in gender training programmes to ensure that they develop a willingness to work with and implement women's ideas and innovations. This would foster a culture of managing soil and soil-related resources based on collective, rather than patriarchal, decisions.
- Adopt a gender specific approach in soil-related decisions and policymaking processes.
- Apply gender sensitive tools in the dissemination of soil information. Gender equality and enhanced women's empowerment in SSM require working with both women and men, bringing them to an equal level of knowledge, knowledge sharing, and access to natural resources. This avoids the misconception that gender equality will simply target women without understanding and addressing gender roles, norms, and relationships peculiar to SSM.
- Design and apply gender mainstreaming tools and gender responsive and gender transformative approaches in sustainable soil management practices.
- Address gender issues and monitor gender-related impacts of the normative legal and policy frameworks governing soil resources.

- Create an enabling environment, such as quota systems, to facilitate equal access for women and men to land and other productive resources, services, local institutions, and organisations.
- Embed into law and policy the recognition of the critical role women play in agriculture, and more specifically, towards soil health and SSM.
- Promote and implement "women-friendly" rules and regulations and revise existing local and national regulatory frameworks and cultural barriers that perpetuate gender inequality. For instance, gender discrimination limits women's access to (agricultural) resources, education, extension, financial services, and labour markets, thereby impacting negatively on SSM in Africa.
- Mainstream gender parity in land tenure and soil management frameworks, which include gender equality as a definite goal, with clear and identifiable targets. In this vein, the plight of women in rural Africa may require more nuanced gender policies to integrate the needs of rural women in agriculture and other soil-related projects and activities.
- Identify gender-specific needs in all soil and soil-related activities, namely climate adaptation, agricultural land, water, forest, and other natural resources; and incorporation of gender-sensitive processes.
- Strengthen public support for soil sustainability and ensure long-term commitment to more responsible soil management by increasing awareness and education on women's involvement. The inter-relationships between soils and social issues, such as agriculture, food security and safety, sustainability, climate change, soil carbon sequestration,[20] greenhouse gas emissions, erosion-driven degradation, and loss of organic matter and nutrients, need to be simplified and consistently packaged into educational awareness programs for all stakeholders, without exception.
- Adopt legal provisions on procedural rights, which are critical in relation to the role of women in soil and environmental management. These procedural rights include the right to access soil information, participation in soil-related decision-making processes, freedom of association, and other related rights of access.
- Increasing women's participation in soil research, policy development, and decision-making would be instrumental in promoting SSM across Africa.
- Build the capacity of universities and research institutes to conduct gender-responsive soil research that informs national programmes and policy, improves collaboration with diverse land users, and ensures women and men can restore, steward, and benefit from soils' ecosystem services.
- Support investments and positive incentives aimed at promoting SSM and gender equality.

20 Fawad (2025).

- Invest in women's leadership and technical skills in SSM.

8.3. Concrete text for legal provisions

These legislative texts may be incorporated into the SSM law or laws that specifically address gender.

Interpretation

Gendered soil sensitisation: The process of educating, engaging, and integrating gender perspectives into sustainable soil and land management practices.

Section 1: Gendered soil sensitisation

(1) The competent authority, in collaboration with the relevant government department, shall design and implement educational and public awareness programs tailored explicitly to gendered soil sensitisation.
(2) These programs will include modules that illustrate the distinct roles, contributions, and challenges experienced by different genders in soil management.
(3) The initiatives shall be integrated into broader sustainable soil management strategies and evaluated regularly through gender-disaggregated data to measure their impact on community awareness and engagement.
(4) The competent authority shall facilitate partnerships with local governments, non-governmental organisations, academic institutions, and community groups to ensure a coordinated and inclusive approach to soil management education.

Section 2: Women's land tenure security

(1) The competent authority shall ensure that policies and laws are reviewed to guarantee equal access to, use of, and control over land for women.
(2) Subject to constitutional limitations and other written laws, discriminatory practices that limit women's ability to own, inherit, lease, or otherwise secure land shall be prohibited.
(3) The relevant competent authority shall establish a transparent registration and dispute resolution process, ensuring efficient and speedy redress for any infringement of women's land rights.

Section 3: Women's participation and empowerment

(1) To ensure robust representation in decision-making, women shall be provided with a minimum quota of [X]% participation in all advisory boards,

committees, and policy-making bodies related to soil management and environmental conservation.

(2) The government will establish empowerment programs, including capacity-building workshops, leadership training, and access to financial services, tailored specifically for women engaged in agriculture and soil conservation initiatives.

(3) Funding shall also be allocated for grassroots projects led by women with promising sustainable soil management practices.

Section 4: Gender-specific needs and vulnerabilities assessment

(1) The relevant competent authority shall conduct periodic assessments to identify and address the gender-specific needs, vulnerabilities, and risks related to soil degradation and unsustainable land use practices.

(2) These assessments shall be participatory in nature, engaging community stakeholders and disaggregating data by gender to inform adaptive policy measures and targeted support programs.

(3) The competent authority shall ensure that results from these assessments are used to prioritise interventions and resource allocations that mitigate the adverse impacts on the most vulnerable groups.

Section 5: Integration of gendered indigenous and local knowledge

Recognition of the value of indigenous and local knowledge systems in sustainable soil management is encouraged, particularly those practices developed and sustained by women and other gender minorities over generations and all necessary measures shall be taken to protect such knowledge and promote its integration in existing training curricula, policy and legislative frameworks to foster a more inclusive and culturally sensitive approach to soil management.

Section 6: Funding, incentives, monitoring, and evaluation

(1) The competent authority shall ensure that the annual budget is allocated to support the implementation of this law, including the development of educational materials, legal support mechanisms, and empowerment projects.

(2) Incentives, including tax benefits and subsidies, may be provided to organisations, cooperatives, and community projects that demonstrably integrate gender-inclusive practices in soil conservation and management.

(3) The competent authority shall establish regular monitoring and evaluation mechanisms, incorporating gender-disaggregated indicators to measure the progress and impact of gender laws in promoting sustainable soil management.

(4) The competent authority shall submit an annual report detailing the progress, challenges, and outcomes associated with these initiatives, with recommendations for ongoing improvements.

(5) Reports shall include metrics such as gender-disaggregated participation rates in training programs, outreach effectiveness, and measurable improvements in sustainable soil practices.

Section 7: Implementation
The provisions of this law shall be implemented by relevant governmental agencies in coordination with local authorities, civil society organisations, and traditional community leaders.

9. Commentary VIII: Implementation and enforcement

This Commentary examines the challenges associated with enforcing and implementing laws for sustainable soil management in Africa. It focuses on the institutional and administrative challenges involved in establishing effective systems to implement and enforce national legislation aligned with the Model Law.

9.1. Challenges

The core challenge lies in the persistent gap between legal development and practical enforcement. While many African states have made progress in drafting soil-related legal provisions, implementation and enforcement remain weak and insufficient. Without effective implementation, legislation has little real-world impact and remains largely symbolic. Therefore, strengthening the mechanisms for implementing and enforcing soil-related laws is a critical precondition for achieving tangible improvements in soil health and land management across the continent.

The main challenges towards an effective administrative implementation and enforcement system are:

9.1.1. Responsibilities within administration are not sufficiently clarified by law

In many cases, responsibilities among ministries and administrative bodies are not clearly defined, resulting in conflicts over competencies and institutional authority. This lack of clarity can lead to inactivity, as it becomes difficult to determine which entity is accountable for implementation outcomes or to duplication of efforts, with overlapping or even contradictory approaches. Such inefficiencies not only delay progress but also consume time and resources that could be saved through clear attribution of mandates. Moreover, disputes over institutional roles can significantly

slow critical decision-making, undermining the timely implementation of sustainable soil management policies.

9.1.2. Insufficient financial resources

Insufficient financial resources within government institutions, including administrative bodies, remain a widespread reality in many African countries. This includes limited access to adequate office infrastructure, digital and communication equipment, transport facilities, and basic operational resources such as electricity and fuel. Such resource constraints significantly hinder the effective implementation and enforcement of legal provisions, including those related to sustainable soil management. Without adequate institutional support, even well-drafted laws struggle to translate into meaningful action on the ground.

9.1.3. Insufficient personnel with adequate expertise and experience

Among other challenges, the lack of financial resources means that many administrative bodies in African countries are understaffed and unable to fulfil their mandates effectively. In addition, existing personnel often lack the necessary expertise and experience required to implement and enforce sustainable soil management laws and policies.

9.1.4. Digitalisation

Emerging digital technologies, including artificial intelligence (AI), offer significant opportunities to enhance the implementation and enforcement of soil-related provisions. However, most African administrative bodies are poorly equipped—or not equipped at all—to adopt and effectively utilise these technologies, limiting their potential impact.

9.1.5. Interplay between modern administration and traditional governance systems

In many African countries, particularly in rural areas, traditional governance systems continue to play a vital role in land and resource management. However, the relationship between modern administrative structures and traditional authorities is often poorly defined, leading to overlapping mandates, contradictory decision-making,

and unclear lines of accountability. This lack of coordination can hinder effective implementation and enforcement of soil-related policies and undermine efforts to establish coherent governance frameworks.

9.2. Main tasks for implementation and enforcement

A wide range of tasks must be implemented and enforced to support sustainable soil management. While the following list is not exhaustive, it illustrates the diversity and complexity of the responsibilities involved. Importantly, clearly attributing these tasks to specific institutions or actors is essential to ensure effective and well-organised implementation. The various tasks are described in the following.

9.2.1. Data management

Data management in the context of soil governance typically involves three main steps: first, the collection of field data on soil qualities, land use, and tenure rights; second, the analysis and interpretation of the collected data; and third, the dissemination of the results to relevant stakeholders, including farmers, competent authorities, and policymakers.

9.2.2. Determination of environmental quality standards

To effectively implement soil-related legal provisions, competent authorities require clear environmental quality standards (EQS). These standards can be developed to address various forms of soil degradation, including erosion, compaction, salinisation, and contamination. The development of EQS typically involves both scientific assessments and normative decision-making. It should be carried out in consultation with relevant stakeholders to ensure legitimacy, contextual relevance, and practical applicability.

9.2.3. Permission procedure concerning potentially detrimental soil uses

According to the Model Law, “Any use of soil that may pose a risk of significant degradation” requires permission by the competent authority (Article 13(2)). The Environmental Impact Assessment should include a specific “soil impact assessment”.

9.2.4. Urban planning

The Model Law also requires urban planning to avoid unnecessary soil sealing and to protect valuable soils, and to "identify options for de-sealing projects" (Article 19(2)).

9.2.5. Zoning mechanisms, including soil-protected areas

The Model Law also foresees zoning mechanisms being undertaken by the competent authority to utilise soil qualities most effectively and to ensure the provision of soil services. To this end, soil-protected areas shall be established (Articles 17 and 18 of the Model Law).

9.2.6. Public participation processes and awareness raising

The Model Law requires that the administration effectively engage the public and relevant stakeholders in decision-making processes, including urban planning, zoning, and the establishment of protected soil areas. The administration should also work towards raising public and political awareness on soil issues.

9.2.7. Monitoring and surveillance

Another key responsibility of the administration is to ensure that relevant societal actors comply with soil-related legal provisions. To achieve this, it is essential to establish an effective system of monitoring and enforcement, which may include on-the-ground inspections, oversight of land-use practices, and other relevant control measures. Digital technologies, such as remote sensing and geographic information systems (GIS), can play a vital role in enhancing the efficiency and accuracy of monitoring efforts.

9.3. Options/recommendations

Given the significant diversity in governmental and administrative systems across African states, a one-size-fits-all solution is neither practical nor appropriate. Accordingly, the following discussion highlights selected dimensions to consider when designing effective systems for implementing and enforcing soil-related legal provisions. It is essential that legislation clearly defines the allocation of powers, competences, and responsibilities, enabling these to be identified, assigned, and

exercised in a structured manner. Importantly, clarifying such roles is often contentious, as they are typically linked to the distribution of resources, institutional authority, and political influence.

9.3.1. Clarification of the responsibilities of ministries

At the highest level of government, it is essential to determine which ministry should assume primary responsibility for implementation and enforcement, and how other relevant ministries should be involved. These decisions should be guided by the nature of the tasks and the specific expertise required for each. Additionally, it must be clearly established whether participating ministries should have veto powers over some issues, particularly where their mandates intersect or where specialised input is critical to decision-making.

9.3.2. Clarification of the responsible level of administration – central, regional, local, community level

Most African administrative systems recognise competence across multiple levels of governance, including federal, regional, and local authorities. It is, therefore, essential, both legally and practically, to clearly define which tasks are to be performed at which level. For example, the collection of field data may be most effectively carried out by local or regional entities with proximity to the land and communities, while the analysis of such data and the development of environmental quality standards may be more appropriately handled at the federal or national level, where greater technical and institutional capacity is available. Ultimately, the allocation of responsibilities should be tailored to each country's specific administrative structure and designed to integrate seamlessly with existing governance systems.

9.3.3. Clarification of science/administration/policy interface

Scientific advice is essential for the effective development and implementation of sustainable soil management policies. To support this, a dedicated scientific entity focused on soil issues should be established at the national or regional level. The mandate and competences of such an entity, particularly its role in decision-making processes such as permit approvals, urban planning, and the designation of protected soil areas, should be clearly defined by law. This legal clarity will help ensure that scientific expertise is systematically integrated into governance processes affecting soil health.

9.3.4. Clarification of cooperation with traditional leaders

Finally, the cooperation between modern administrative institutions and traditional governance systems, which remain prevalent in most African states, particularly in rural areas, should be clearly defined by law. While this process may be politically and socially sensitive, legal clarity regarding the roles and competencies of each governance actor is essential. Such clarification can help prevent duplication of effort, reduce the risk of conflicting decisions, and promote more efficient, coordinated use of resources in implementing sustainable soil management policies.

9.4. Benefits

Establishing an effective administrative system to implement and enforce soil-related legal provisions is crucial to achieving sustainable soil management and delivering long-term benefits to the population. From this perspective, such a system is not optional but imperative.

Beyond its foundational necessity, an effective administrative system can yield several additional benefits: First, it enables more efficient use of limited resources. By reducing duplication and improving coordination, fewer inputs are required to achieve the same or better outcomes, which is especially important for resource-constrained societies. The savings generated can be redirected to meet other pressing needs. Second, it fosters accountability, reliability, and transparency—hallmarks of a modern, functional, and prosperous state. Third, from the citizens' perspective, such a system enhances public trust and reinforces the legitimacy of political institutions. Fourth, it helps establish a level playing field for all actors, including foreign investors. Reducing mismanagement, abuse of power, and corruption strengthens the rule of law and improves the overall governance environment.

Ultimately, an effective administrative system enhances the state's reputation, both domestically and internationally, as a credible and reliable partner. This, in turn, attracts long-term investment from domestic and foreign economic actors, enabling sustainable economic development that benefits both investors and society.

10. Commentary IX: Industry, infrastructure and projects, and energy transition

Soil degradation in Africa is primarily, but not uniquely, driven by agriculture, mining, industrialisation, infrastructure, and rapid urbanisation. This Commentary focuses on the soil impacts of industrial facilities and infrastructure projects, addressing: 1) the adverse effects of industrial waste and soil sealing, and 2) the impact of renewable

energy infrastructure on soil management. It examines governance measures, including zoning, permits, and soil restoration and remediation mechanisms.

Africa is a rising renewable energy powerhouse, crucial for its industrialisation. With vast resources and growing demand, it is driving significant technological and infrastructural advancements. Abundant solar, wind, geothermal, and hydropower potential could add hundreds of gigawatts of capacity by 2030, especially through large-scale projects. However, this infrastructure build-up poses environmental challenges, particularly to the soil.

10.1. Description of soil-related challenges

10.1.1. Challenges in the construction of industrial facilities

Industrial development remains limited in several African countries. While many governments acknowledge the importance of industrialisation for economic growth and improved livelihoods, the establishment of key industrial zones often proceeds with insufficient attention to soil and environmental management. This imbalance has resulted in widespread environmental degradation. For example, in Nigeria's Niger Delta and along oil pipeline corridors in Angola, frequent oil spills continue to pollute soil and water resources, underscoring the serious consequences of inadequate environmental oversight and regulatory enforcement.

Most industries in African countries lack international environmental certifications, such as ISO 14001, which promotes the development of effective environmental management systems and accountability for environmental impacts. In the absence of such standards, many industries discharge pollutants that contribute significantly to soil degradation and broader ecological harm. Furthermore, refinery operations across the continent are significant sources of soil and marine pollution, particularly due to the indiscriminate disposal of sludge and other hazardous by-products. The weak enforcement of environmental laws and regulations exacerbates these challenges.

Soil conservation is not prioritised in development planning, even as Africa's growing population, rapid urbanisation, and infrastructure development continue. Legal measures have not evolved to address these challenges, often sidelining soil conservation in favour of production/construction goals. Zoning approaches are not sufficiently implemented to protect valuable soil compartments.

Infrastructure development is often associated with massive land clearing, deforestation, soil compaction, sealing, and alteration of natural drainage patterns, leading to soil degradation and loss of fertility.

Industrial development must be aligned with food production to ensure sustainable growth. Building industrial facilities and infrastructural projects on agricultural land should be avoided.

10.1.2. Challenges in renewable energy and industrial facilities

In response to the immense continental potential, increasing energy demand, and global climate commitments, many African countries are implementing policies to accelerate the adoption of renewable energy sources. Some countries are revising their energy frameworks to incentivise clean energy investments and infrastructure through tax incentives, feed-in tariffs, and streamlined permitting processes.[21] These policy shifts pave the way for a more favourable investment climate, increasing demand for technological innovations, and boosting infrastructure. This, in turn, creates a significant demand for land and, consequently, negatively impacts soil and other natural resources. Emerging technologies, such as advanced energy storage systems and smart grid solutions, are enhancing the reliability and integration of renewable energy sources.[22] Innovations in micro-grid and off-grid solutions significantly extend electricity access to remote and underserved communities, driving inclusive economic growth.

Despite these promising trends, most African countries face several challenges in their transition to renewable energy, including infrastructure limitations. In many regions, outdated or insufficient grid infrastructure is hampering the integration of renewable energy projects. Investments in modernising transmission networks are crucial to ensure that newly generated renewable power reaches consumers reliably.

While the energy transition presents opportunities, it also requires significant investment in infrastructure and technology. Africa's urbanisation has concentrated demand for household building materials and services. This presents a novel opportunity for African countries to advance climate-resilient manufacturing and industrialisation by developing low-carbon regional value chains that meet this demand.

Developing robust energy infrastructure is more than just constructing power stations. It involves a complex system of interconnected components, including long-distance transmission lines that distribute electricity across entire countries, pipeline networks that transport oil and natural gas, sophisticated refineries that process raw materials into usable fuels, and a diverse transportation system encompassing maritime and rail logistics. This infrastructure is the foundation for powering our homes, businesses, and industries. Africa's development is at a critical juncture. Therefore, rapid and substantial investment in essential public services, such as schools and

21 GIZ (2020).
22 Kataray et al. (2023).

hospitals, as well as in all economic sectors, is necessary to accelerate this process to drive meaningful progress.

The establishment of green energy systems is often funded by foreign investments, which may lead to high energy exports to foreign countries. This could be detrimental to the domestic population and seen as neocolonialism.

Industrial infrastructure construction often involves land conversion and clearing, resulting in the loss of fertile soil and land degradation. Agricultural expansion, urbanisation, infrastructure development, mining, and unsustainable logging practices are the main drivers of deforestation and soil degradation.

Sustainability in infrastructure is critical across multiple sectors, particularly in the design, construction, engineering, and operation of electric grids, oil and gas facilities, hydrogen infrastructure, and buildings. Integrating environmental, social, and governance (ESG) principles into these systems ensures that development meets present needs without compromising the ability of future generations to meet their own needs. Sustainable infrastructure practices enhance resource efficiency, reduce environmental impacts, and contribute to climate resilience and long-term economic viability.

Climate change remains a significant threat impeding the pathway to sustainable development for many African countries. Extreme climatic conditions have impacted key economic sectors, including agriculture, infrastructure, energy, and forestry. Given the prevailing climatic conditions, agricultural production is expected to decline. Other African countries are also facing climate-related challenges, such as drought, which is negatively impacting energy production and exacerbating food insecurity.

Industry and infrastructure are governed by various laws and regulations to mitigate adverse impacts on land and the environment. Environmental legislation requires infrastructure and industry developers to conduct EIAs to assess the potential effects on land, natural resources, and local communities. An environmental permit must be obtained before any industrial or infrastructure project begins, stipulating the conditions necessary to minimise environmental impacts.

Spatial planning requires that industrial and infrastructure projects align with established land use and urban development plans. This includes the clear designation of industrial zones, protected areas, and environmentally sensitive sites. To minimise adverse impacts on land resources, such projects must comply with construction and waste management standards. This entails adopting sustainable construction techniques, responsible siting, and implementing efficient, environmentally sound waste management practices.

Government authorities must actively monitor and regulate industrial and construction activities to ensure full compliance with environmental laws and policies. Regular inspections should be conducted to identify violations and enforce appropriate corrective measures. Promoting environmental responsibility among developers is

essential, including the mandatory rehabilitation of project sites upon completion to restore degraded soil and minimise long-term ecological harm.

10.2. Options for legal governance mechanisms

A comprehensive and integrated approach is necessary when considering legal governance mechanisms to address the impact of industrial facilities, infrastructure projects, and the energy transition on soil prevention and restoration in Africa.

10.2.1. Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs)

Mechanism:

- Mandatory EIAs for all industrial and infrastructural projects, including renewable energy installations, that may significantly impact the soil with a specific "soil impact assessment" pursuant to Article 14 of the Model Law.
- SEAs for energy transition policies and plans, assessing cumulative impacts on soil resources.

Purpose:

- Identify and mitigate potential soil degradation risks early in the planning process.
- Ensure sustainable development practices.

Implementation:

- Establish clear EIA/SEA guidelines, including soil-specific assessment criteria.
- Ensure public participation and access to information.
- Strengthen the capacity of environmental authorities.

10.2.2. Land use planning and zoning regulations

Mechanism:

- Develop and enforce land use plans that designate industrial, infrastructure, and renewable energy development areas, considering soil sensitivity and ecological vulnerability.
- Implement zoning regulations to control land conversion and prevent soil degradation.

Purpose:

- Minimise soil disturbance and protect fertile agricultural lands.
- Promote sustainable land use practices.

Implementation:

- Integrate soil health considerations into spatial planning.
- Strengthen local government capacity for land use management.
- Ensure community involvement in land use planning.

10.2.3. Soil protection and restoration laws

Mechanism:

- Enact specific laws that protect soil resources, regulate soil disturbance, and promote soil conservation practices.
- Establish legal frameworks for soil restoration and remediation of contaminated sites.

Purpose:

- Prevent soil erosion, compaction, and contamination.
- Ensure the restoration of degraded soils.

Implementation:

- Develop soil quality standards and guidelines.
- Establish enforcement mechanisms and penalties for violations.
- Provide incentives for soil restoration and sustainable land management.

10.2.4. Waste management regulations

Mechanism:

- Develop and enforce regulations for industrial waste management, including hazardous waste disposal and effluent discharge.
- Promote waste reduction, recycling, and reuse.

Purpose:

- Prevent soil contamination from industrial waste.
- Minimise the environmental footprint of industrial activities.

Implementation:

- Establish waste treatment and disposal standards.

- Strengthen monitoring and enforcement of waste management regulations.
- Promote circular economy principles.

10.2.5. Water resources management laws

Mechanism:

- Implement integrated water resources management laws that regulate water abstraction, protect water quality, and promote water conservation.
- Address soil salinisation and waterlogging issues related to irrigation and drainage.

Purpose:

- Prevent soil degradation caused by unsustainable water use.
- Ensure equitable access to water resources.

Implementation:

- Establish water allocation mechanisms and water quality standards.
- Promote water-efficient irrigation practices.
- Address transboundary water issues.

10.2.6. Contractual agreements and investment treaties

Mechanism:

- Incorporate soil protection clauses into investment contracts and bilateral/multilateral investment treaties (BITs/MITs).
- Establish dispute resolution mechanisms for soil-related issues.

Purpose:

- Set clear environmental obligations for investors.
- Ensure accountability for soil degradation.

Implementation:

- Develop model contract clauses and treaty provisions.
- Strengthen the capacity of dispute resolution bodies.

10.2.7. Community participation and empowerment

Mechanism:

- Establish legal mechanisms for community participation in environmental monitoring and enforcing soil protection laws.
- Promote community-based soil management initiatives.

Purpose:

- Enhance local ownership and promote sustainable land management practices.
- Ensure that environmental policies reflect community needs and priorities.

Implementation:

- Provide access to information and capacity building for community organisations.
- Establish mechanisms for public participation in decision-making.

10.3. Concrete text for legal provisions

Specific legal provisions can be integrated into national and regional frameworks to effectively address the impact of industrial development, infrastructure, and the energy transition on African soils.

Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs)

(1) All industrial facilities and infrastructure projects, including renewable energy installations exceeding [specified size/capacity], shall undergo a mandatory Environmental and Social Impact Assessment (ESIA) before approval. The ESIA shall include a comprehensive soil impact assessment, detailing potential risks of soil degradation and associated mitigation measures.
(2) Article 14 of the Model Law concerning a specific 'soil impact assessment' shall apply.
(3) Strategic Environmental Assessments (SEAs) shall be conducted for national and regional energy transition plans, evaluating the cumulative impacts of renewable energy infrastructure development on soil resources. These SEAs shall inform policy decisions and project planning.
(4) The ESIA must contain a soil remediation and restoration plan in case of soil contamination.

Land use planning and zoning regulations

(1) Municipalities shall develop land use plans that designate areas for industrial, infrastructure, and renewable energy development, considering soil sensitivity and ecological vulnerability. Conversion of prime agricultural land for industrial or infrastructure purposes shall be prohibited unless justified by overriding public interest and accompanied by compensatory measures.
(2) Zoning regulations shall establish buffer zones around industrial facilities and infrastructure projects to minimise soil disturbance and protect surrounding ecosystems. These buffer zones shall be maintained as natural or semi-natural areas.
(3) Renewable energy installations, such as solar and wind farms, shall be sited on degraded or marginal lands whenever feasible to minimise impacts on fertile agricultural soils.

Soil protection and restoration laws

(1) Industrial facilities shall implement soil erosion control measures during construction and operation, including using sediment traps, contour ploughing, and revegetation of disturbed areas. Soil compaction shall be minimised using appropriate construction equipment and techniques.
(2) Contaminated soil resulting from industrial activities shall be remediated to meet soil quality standards established by the national environmental authority. The polluter shall bear the cost of remediation.
(3) The removal and stockpiling of topsoil during construction activities must be done in a way that preserves the biological and chemical properties of the soil.
(4) A national soil health monitoring network shall be established to track soil quality trends and assess the effectiveness of soil protection measures.

Waste management regulations

(1) Industrial facilities shall implement closed-loop systems to minimise waste generation and promote recycling and reuse. Hazardous waste shall be treated and disposed of in accordance with national and international standards.
(2) Effluent discharge from industrial facilities shall comply with water quality standards that protect soil health. Irrigation with treated wastewater shall be subject to soil monitoring and control measures to prevent salinisation and contamination.
(3) Regulations concerning the disposal of solar panels and wind turbine components, at the end of their life cycles, must be established and enforced.

Water resources management laws

(1) Large-scale irrigation projects shall be subject to water use permits and soil salinity monitoring requirements. Water-efficient irrigation technologies shall be promoted to minimise waterlogging and salinisation.
(2) Infrastructure projects, such as roads and railways, shall incorporate stormwater management measures to prevent soil erosion and flooding. These measures shall include using permeable pavements, rain gardens, and constructed wetlands.

Contractual agreements and investment treaties

(1) Investment contracts and bilateral/multilateral investment treaties (BITs/MITs) shall include clauses that explicitly recognise the host state's right to regulate in the public interest, including protecting soil resources. Investors shall be required to comply with national soil protection laws and regulations.
(2) Dispute resolution mechanisms in investment treaties shall consider the environmental impacts of investment projects, including soil degradation. Compensation for soil damage shall be based on the principle of full reparation.

Community participation and empowerment

(1) Local communities shall have the right to participate in environmental monitoring and enforcing soil protection laws. Community-based soil management initiatives shall be supported through capacity building and resource access.
(2) A public environmental complaints mechanism shall be established to report soil degradation incidents related to industrial facilities and infrastructure projects. Whistleblowers shall be protected from retaliation.

11. Commentary X: Mining

Mining remains a predominant economic pillar for most African countries, following oil and gas, agriculture, and tourism.[23] It serves as a cornerstone of industrial development, driven by the continent's vast mineral wealth and the rising global demand for strategic resources such as lithium, nickel, graphite, and cobalt, particularly to support energy transitions and accelerated industrialisation. Africa holds approximately 30% of the world's known mineral deposits, including diamonds, cobalt, gold, copper, and uranium, which are extensively mined and contribute significantly to fiscal revenues.[24] While mining intensity varies by mineral and

23 Chuhan-Pole et al. (2017).
24 See https://www.unep.org/regions/africa/our-work-africa/, accessed 29 September 2025.

country, 42 of Africa's 55 states are classified as resource-dependent.[25] Among these, eighteen rely primarily on non-fuel minerals, ten on energy or fuel exports, and the remainder on agricultural commodities.

This Commentary highlights three key factors driving the prevalence of mining activities across Africa. First is the availability of strategic mineral resources within specific countries. Second is the degree of economic diversification away from extractive sectors towards alternatives such as tourism and agriculture. Third is the dominant type of mining, which can be either artisanal and small-scale, industrial, large-scale, or a combination of both. These factors—mineral availability, economic diversification, and the mining model—collectively shape the intensity and nature of mining across the continent. For instance, leading gold-producing countries such as South Africa, Burkina Faso, Guinea, and Mali face distinct soil and environmental challenges compared to nations predominantly mining copper and cobalt (e.g., the Democratic Republic of Congo and Zambia) or those centred on diamond extraction (such as Botswana and Namibia).[26]

11.1. Description of challenges

Despite generating significant economic and social benefits, both large-scale and artisanal and small-scale mining (ASM) activities pose serious environmental risks to soil across much of Africa. Although many African countries have enacted ecological and mining legislation aimed at mitigating such damage, substantial gaps remain in the practical implementation, compliance, and enforcement of these laws. These deficiencies hinder the ability to balance the gains of the extractive sector with the imperatives of sustainable soil and environmental stewardship.

Both industrial large-scale mining and ASM result in extensive land degradation, albeit through different mechanisms. Industrial mining typically causes severe soil and land disruption through large-scale excavation and the development of deep underground galleries, often rendering land permanently unsuitable for agricultural use. In gold-producing countries, mining activities frequently contaminate soil with toxic substances, including mercury and cyanide, which pose significant health risks to surrounding communities. One of the most critical environmental concerns associated with both mining and mineral processing is the contamination of soils, river systems, and crops through direct emissions and tailings-dam effluents.

Strong political will is essential to ensure the effectiveness of mining regulations that mitigate the environmental impacts of both industrial and artisanal mining. The success of these regulations depends not only on their existence but also on their

25 See https://360mozambique.com/world/africa/top-ten-african-countries-that-heavily-depend-on-mining-exports/, accessed 29 September 2025.

26 Ibid.

consistent implementation, the awareness of all relevant stakeholders, and the strict enforcement of sanctions for non-compliance. However, in many African countries, these efforts are undermined by significant shortcomings, including inadequate environmental standards and weak enforcement mechanisms within existing ecological and mining legislation. Further arising challenges are specified below.

11.1.1. Industrial large-scale mining, often undertaken by foreign investors

Industrial and large-scale mining investments in Africa often begin with the acquisition of vast tracts of land, frequently through unfair or illegal means that disregard customary or indigenous land tenure systems. As highlighted in the commentary on land tenure, tenure insecurity, exacerbated by the coexistence of customary and statutory regimes and by the fact that approximately 90% of rural land remains undocumented, poses a significant obstacle to sustainable soil management. This legal ambiguity exposes communities to dispossession, as they lack effective legal recourse when governments allocate their lands to investors.

To safeguard customary land rights and promote soil protection, more inclusive and participatory consultation processes are required to ensure that local communities give free, prior, and informed consent before mining licences are issued. The link between tenure insecurity and soil degradation becomes particularly pronounced in this context. Soil degradation caused by industrial mining spans all phases of the mining lifecycle—preparatory, operational, and closure—resulting in long-term environmental harm. Large foreign conglomerates, which dominate the sector, often fail to implement adequate ecological safeguards. Their operations frequently involve the use of toxic substances such as mercury and cyanide, which degrade soil health, contaminate ecosystems, and harm local livelihoods.

This is compounded by weak regulatory enforcement and investment regimes that favour investors, offering tax incentives and long-term leases, without adequately holding them accountable for environmental impacts. Despite expectations that investors operate within host states' legal frameworks, numerous examples across Africa illustrate how these frameworks fail to address the resulting soil and environmental damage, particularly in the mining sector. Moreover, pollution from industrial mining, particularly from tailings dams and hazardous waste, is often poorly monitored and insufficiently addressed in current legislation, resulting in widespread soil contamination with heavy metals and other toxins.

11.1.2. Legal and illegal artisanal and small-scale mining by both foreign investors and local communities

The statistics indicate that 70–80% of African artisanal and small-scale mining operations are illegal, while 20–30% are legal but often improperly overseen, monitored, and evaluated.[27] Failure to consider these dynamics leads to the implementation of inappropriate legislation and industry support schemes. In the case of sub-Saharan Africa, the predominantly 'top-down' approach taken to formalise and support ASM has resulted, inter alia, in the dissemination of inappropriate processing and environmental technologies; the implementation of bureaucratic licensing schemes; and the design of ineffective and/or incompatible regulations.

The dynamics of artisanal and small-scale mining in sub-Saharan Africa vary from country to country but present similar challenges. This type of mining focuses on extracting a wide range of—predominantly—precious minerals and stones, including gold, sapphires, and diamonds. Complex labour hierarchies characterise it, as do unique forms of production and informal systems of assistance, all of which have evolved, for the most part, in an environment devoid of regulation.

A new phenomenon across much of Africa is that artisanal and small-scale mining is being illegally driven by foreign investors who avoid the formalities of large-scale industrial mining. This illegal artisanal and small-scale mining may be carried out using sophisticated machinery, thereby compromising the rural environment and soil more than anticipated.

11.1.3. Incidents caused by both industrial large-scale and artisanal and small-scale mining

The core dimensions of good governance with respect to mining include:

- Consideration of the interests of the local communities, primarily concerning access to land;
- mitigating adverse effects on the environment, on soils, and on human health; and
- sharing economic benefits—the interest of the local communities and society in gaining financial benefits from the mining activities.

27 Ondanyo et al. (2024).

11.2. Options for legal governance mechanisms

11.2.1. Industrial mining, often undertaken by foreign investors: EIA soil standards, permission procedures, CSR, transnational cooperation

Industrial and large-scale mining can harm the environment and natural resources, including soil. Therefore, African countries need to enact mining legislation that minimises these adverse effects and recognises and values the interests of local communities. This necessitates periodic reviews and updates to mining law and policy to ensure alignment with international best practices. Strict environmental standards, including soil standards, must also be implemented. Comprehensive regulations relating to mining waste management, site rehabilitation and remediation, and biodiversity protection must be enacted.

The integration of Corporate Social Responsibility (CSR) should be required of mining companies, with a focus on community engagement, local job creation, and the development of social infrastructure. Institutional capacity building is also necessary to ensure that government agencies can enforce policies effectively and efficiently. Additionally, research and development efforts should be encouraged to foster innovation in environmentally friendly soil management technologies.

Outside direct mining activities, African states need strengthened transparency requirements for foreign contracts and financial flows, particularly in the case of large-scale industrial mining. It is essential to promote local participation and CSR while also ensuring compliance with and enforcement of environmental standards.

With Africa's evolving technological outlook, it is possible to establish anonymous reporting mechanisms for violations and create strong national public online platforms for transparent access to environmental impact reports, mining permits, and data on emissions, mining waste, and soil degradation. Innovative technologies, such as drones and remote monitoring, are also encouraged to improve environmental oversight.

11.2.2. Official artisanal and small-scale mining: same, stronger involvement of traditional leaders

The initiatives in this section can be institutionalised through the traditional leadership structures of local communities. Artisanal and small-scale mining is essential for local community participation and socio-economic needs across Africa, contributing to economic growth and employment in many African nations. African governments must encourage responsibility through training, financial support, and incentives for implementing sustainable soil governance. Additionally, institutional capacity-building is necessary to ensure that government regulatory agencies can effectively

enforce policies and legislation that address the adverse effects of mining on soils across Africa.

Artisanal and small-scale mining is primarily informal and unorganised, with minimal support or intervention from African governments. A dedicated continental and regional approach based on multi-sectoral and multidisciplinary cooperation would be needed to invest in, improve, and adopt affordable, cleaner, safer, and more efficient alternative mining techniques. Incidents caused by industrial mining must be subject to strict liability, ensuring that the polluter pays for all consequential harm. This will help to address detrimental environmental effects, injury, diseases, and premature deaths.

11.2.3. Illegal mining, mainly in the form of small-scale or artisanal mining

Providing a coordinated assessment of environmental and public health issues associated with artisanal and small-scale mining in Africa is essential. While illegal mining must be severely sanctioned, it is crucial to minimise it by establishing a conducive and simplified legal framework that facilitates artisanal mining.

11.3. Concrete text for legal provisions

The proposed legal text may be integrated into existing mining and environmental laws, as each country deems fit. The provisions must be tailored to each country's circumstances. While many suggestions may be proposed for mining, this text primarily focuses on soil conservation in the mining sector.

Legislative text is essential in the following:

Interpretation
"Artisanal mining" refers to traditional and customary mining operations that primarily utilise rudimentary methods and manual tools to extract minerals from the surface and shallow depths.
"Minerals" refer to (…) [definition should include soil]
"Small-scale mining" concerns (…) [definition may limit the area of mining coverage, number of people employed, amount of initial investment made, and amount of ore produced in a year, etc.]
"Large-scale mining" concerns (…) [definition may limit the area of mining coverage, number of people employed, amount of initial investment made, and amount of ore produced in a year, etc.]

International mining standards

(1) Any prospecting or mining operation must be conducted in accordance with good international mining industry practice.

(2) The principles set out in [environmental legislation] shall
   (a) apply to all prospecting and mining operations and any matter or activity relating to such operation; and
   (b) serve as guidelines for the interpretation, administration, and implementation of the environmental requirements of this [mining] law.

Regulation of small-scale and artisanal mining[28]

(1) A person who intends to carry on any artisanal mining, small-scale mining, or large-scale mining shall apply to the [competent authority] for an appropriate mining licence in the prescribed manner and form on payment of a prescribed fee.

(2) Artisanal mining shall only be undertaken by a [citizen] or a [co-operative wholly composed of citizens] or [any person].

(3) Small-scale mining shall only be undertaken by a [wholly citizen-owned company] or [a body corporate having a minimum of (…) percent of its shares held by citizens of [Country X]; or a co-operative society registered in [Country X] having a minimum of (…) percent of its member being citizens of [Country X].

Environmental/Soil Impact Assessments[29]

(1) In accordance with good international mining industry standards, the applicant for a mining licence or any renewal of either shall prepare and submit a comprehensive Environmental Impact Assessment (EIA).

(2) The EIA shall contain a specific "soil impact assessment" pursuant to Article 14 of the Model Law.

(3) Notwithstanding subsection (1), an application for a small scale mining licence shall be accompanied by a report on the anticipated impact of mining operations on the environment and any measures to be taken to assess, prevent, or minimise such impact, including proposals for –
   (a) the prevention or treatment of soil pollution;
   (b) the treatment and disposal of waste; and

28 This section deals with eligibility requirements, requirements for a licence application to an appropriate mining licence, and a specific requirement for development.

29 Soil management and conservation plans should include the segregation, proper placement, and stockpiling of clean soils and overburden material for site remediation. If topsoil is pre-stripped, it must be stored for future rehabilitation to preserve its integrity. Storage areas should be temporarily protected or vegetated to prevent erosion, and any exposed soils or erodible materials should be promptly re-vegetated or covered. Subsection (3) requires SSMs to submit a simplified environmental impact assessment.

(c) the reclamation and rehabilitation of land and soil disturbed by mining operations.

Environmental considerations

(1) In considering whether to grant a mining licence, the competent authority shall consider the need to –
   (a) conserve and protect the soil and features of cultural, architectural, archaeological, historical, or geological interests;
   (b) ensure that any mining or mineral processing activity prevents any adverse socio-economic impact or harm to human health, in or on the land over which the right or licence is sought; and

(2) A mining licence holder shall implement appropriate soil conservation measures before, during, and after mining operations.

Soil rehabilitation and remediation processes[30]

(1) The holder of a mining licence shall ensure that their mining area is rehabilitated from time to time and ultimately reclaimed, so far as is practicable, in a manner acceptable to the competent authority.

(2) Notwithstanding subsection (1), during and after operations in any mine, excavation, or waste dump, the licence holder must take necessary measures to maintain and restore topsoil and return the land substantially to its original condition.

(3) If there is any dispute as to the extent of the measures necessary to comply with the requirements of this section, the holder of a mining licence may refer the question to arbitration.

(4) If a mining licence holder fails to meet the obligations under this section, the Minister may restore the area after notifying the holder and granting a reasonable period for action. The restoration cost becomes a debt owed to the government, recoverable in a competent court.

(5) The competent authority may cancel the mining licence where the mining licence holder does not comply with the terms of the mining licence.

30 Generally, holders of small-scale mining licences are the same as holders of large-scale exploitation licences, except that certain environmental, social, labour, and reporting obligations are often lighter for SSM licence holders because their operations are smaller in size and impact. Their licences are shorter than the terms of large-scale exploitation licences, and their projects involve a much smaller investment.

Capacity building[31]

(1) The competent authority shall regularly conduct a training course for [any person] or [artisanal miners] who apply for a licence under this law and do not have relevant qualifications.
(2) A course, in accordance with subsection (1), shall cover topics such as good mining practices and soil resource management in mining.
(3) A holder of a small-scale mining licence or large-scale mining licence shall carry out a scheme of training and employment of local employees in each phase and level of operations, taking into account the safety requirements and the need to maintain acceptable standards of efficiency in the conduct of the operations.
(4) Failure by a holder of a mining right to comply with the provisions of subsection (3) shall be regarded as a material breach. If such a person holds a small-scale or large-scale mining licence, the licence may be suspended or cancelled.

Risk monitoring and management measures for artisanal and small-scale mining[32]

(1) A competent authority may, at a reasonable time, and on the production of the appropriate authorisation
  (a) enter, inspect, and examine a mine in a manner that does not unnecessarily impede or obstruct the working of the mine;
  (b) examine and inquire into
    (i) the state and condition of a mine or part of the mine and of matters and things that pertain to the mine in so far as they relate to the safety or health of persons employed in the mine; and
    (ii) matters relating to these regulations, to minimise environmental damage caused by mining and mining-related operations.
  (c) enforce compliance with these regulations.
(2) A competent authority may, by written notice to a holder of a mining licence or the manager of a mine, order

31 This provision enables the government to develop skills for artisanal miners. Additionally, SSMs and large-scale mining operators are required to provide training to their employees. The government may offer refund-based incentives to companies that provide such training. Effective compliance monitoring requires significant government capacity; where capacity is limited, mining licence holders should publish annual progress reports to facilitate public oversight.

32 Mine inspections ensure operations comply with legal standards. Most mining laws, health and safety regulations, and national laws mandate regular inspections, as reflected in the ILO Safety and Health in Mines Convention, 1995 (No. 176). Consequently, countries often require biannual or annual inspections, as well as one before a new mine opens. Investigative inspections targeting high-risk areas or practices may follow risk assessments or complaints, underscoring the need for anonymous non-compliance reporting by the public and mine workers. Effective inspections rely on inspectors' expertise and clear procedural rules, with non-compliance leading to remediation opportunities or penalties based on the level of risk.

(a) the cessation of operations in, and the withdrawal of any or all persons from the mine or part of the mine where the inspector considers necessary in the interest of safety, health, or the environment; or

(b) the holder or the manager of the mine to remedy the situation immediately or within the time specified by the Inspector.

Corporate Social Responsibility[33]

(1) The holder of a small-scale or large-scale mining licence shall assist in the development of mining communities affected by its operations to promote sustainable development, enhance the general welfare and the quality of life of the inhabitants, and shall recognise and respect the rights, customs, traditions, and religion of local communities.

(2) In pursuance of subsection (1), the holder of a small-scale or large-scale mining licence shall enter into a written community development agreement with the host community.

(3) The community development agreement shall consider the unique circumstances of the licence holder and host community. Issues to be addressed in the agreement may include environmental and socio-economic management methods and procedures, as well as enhancements to local governance.

(4) A community development agreement agreed and signed by the authorised representatives of a small-scale or large-scale mining licence and its host community shall be submitted for approval to the competent authority, who shall, if the agreement meets the relevant requirements, approve such agreement within [X] calendar days of it being submitted.

Reports and access to data

(1) A mining licence holder shall maintain records of all geological information obtained by, or on behalf of, the holder, including data on soil properties.

(2) A mining licence holder shall submit to the competent authority the geological information obtained by, or on behalf of, the holder.

33 A key factor in promoting community development is aligning corporate social responsibility with local goals. The laws should clearly guide the negotiation and drafting of Community Development Agreements (CDAs), which must require consultation with local communities to set project priorities and ensure alignment with local government development plans. Additionally, CDAs should establish formal mechanisms, such as a representative committee comprising the mining company, the local community, and the government, to monitor implementation, produce annual progress reports, and hold regular meetings.

12. Commentary XI: Migration

A complex interplay of push factors and pull factors, including national movements, cross-border flows, conflict, and environmental stressors, shapes migration in Africa. These migration patterns have significant implications for land use across the continent. In many cases, migration leads to the abandonment of agricultural land, particularly in rural areas, which contributes to land degradation and shifts in land management practices. According to the Intergovernmental Panel on Climate Change (IPCC), global warming is projected to drive a sharp increase in internal displacement, with estimates ranging from 51 to 100 million internal migrants by 2050.[34] Economic pressures, including the search for employment, declining agricultural profitability, and limited financial resources, are major drivers of rural-urban migration in Africa. These dynamics particularly affect the youth, who often leave rural areas in pursuit of better opportunities, resulting in ageing populations and increasing tracts of uncultivated land. Environmental stressors, such as land degradation, water scarcity, and the growing frequency of extreme weather events, further compel communities to migrate in search of more viable agricultural conditions. Moreover, conflict, political instability, and insecure land tenure discourage long-term investment in land and soil management, frequently leading to the abandonment of farmland and the breakdown of rural livelihoods.

Recognising these complex dynamics, the Migration Policy Framework for Africa and its Plan of Action (2018–2030) provides a comprehensive roadmap for managing migration effectively while maximising its developmental benefits.[35] It promotes the protection of migrants' rights, regional cooperation, and the integration of migration into national development plans. In this Commentary, the term "migration" refers to the movement of people across national or international borders, whether voluntary or involuntary, driven by various factors[36] that may influence sustainable soil management. This Commentary examines the challenges and opportunities associated with African migration in the context of sustainable soil management and explores legal and policy options to enhance migration governance.

12.1. Challenges

Managing migration for various reasons poses significant challenges, especially (albeit not uniquely) concerning soil management. When people migrate within a country or

34 See https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter16.pdf.
35 See https://au.int/sites/default/files/documents/35956-doc-au-mpfa-executive-summary-eng.pdf.
36 See https://www.fao.org/migration/en, accessed 29 September 2025.

across borders, it can impact agricultural practices, land use patterns, and soil quality in several ways.

12.1.1. Land abandonment

Migration often leads to agricultural land abandonment as farmers leave rural areas in search of "greener pastures," better opportunities in urban centres, or abroad. This can result in neglected farmland, leading to soil degradation and a loss of fertility. Land abandonment due to migration is a growing global challenge with far-reaching environmental, economic, and social consequences. From a soil management perspective, the consequences of land abandonment are immediate and long-term. Without active farming practices, abandoned land becomes vulnerable to erosion, compaction, and nutrient depletion.[37] As soil conservation methods such as crop rotation and organic fertilisation are no longer employed. Over time, this reduces the land's ability to support sustainable agriculture. The lack of soil management also encourages the growth of invasive plant species, which alter soil composition and further degrade its quality. In regions prone to extreme weather events, such as droughts or heavy rainfall, the absence of protective vegetation exacerbates soil erosion. While some abandoned land may experience a "fallow effect," in which natural regeneration of soil properties occurs, this is contingent on the land remaining undisturbed by overgrazing or illegal cultivation. Land abandonment also triggers a feedback loop: as soil quality declines and agricultural activity decreases, rural economies suffer, further driving migration and intensifying the cycle of land degradation.

12.1.2. Changes in land use and agricultural practices

Migration can significantly affect agricultural practices and soil management, with both positive and negative consequences. Migrants often introduce new agrarian techniques or abandon traditional practices, which can affect soil health and productivity. In regions where migrants settle, agricultural land may be converted to residential or commercial use, altering soil composition and reducing its capacity to support sustainable agriculture. The forced displacement of people due to violence, political instability, or resource-based conflicts places additional pressure on host regions, resulting in overexploitation of fragile ecosystems and further soil degradation. In some cases, unplanned agricultural expansion by displaced populations leads to unsustainable practices such as slash-and-burn farming, accelerating

37 Maxwell (2025).

deforestation,[38] soil erosion, and biodiversity loss. However, abandoned lands in conflict-affected areas may naturally regenerate due to the fallow effect, allowing them to recover specific chemical, physical, and biological properties. On the other hand, the abandonment of farmlands can lead to a loss of soil fertility, erosion, compaction, and the invasion of non-native plant species. Meanwhile, in areas receiving migrants, agricultural intensification often leads to the overuse of chemical fertilisers, pesticides, and other inputs, degrading soil health over time.

12.1.3. Pressure on urban infrastructure and environmental impacts

Rapid migration from rural to urban areas places significant pressure on urban infrastructure while posing serious challenges to soil management and ecological sustainability. As cities expand, fertile agricultural land is often converted into urban areas,[39] leading to soil sealing that prevents water absorption, disrupts drainage systems, and increases the risk of flooding and food insecurity. Unregulated urbanisation also contributes to soil pollution through improper waste disposal and industrial activities, degrading land quality. The loss of vegetation exacerbates soil erosion, making areas more prone to landslides and sedimentation in water bodies. Large-scale migration can have broader environmental consequences, including deforestation, habitat loss, and increased pressure on natural resources, which negatively impact soil quality and the provision of ecosystem services. Food security is also threatened, as reduced local agricultural production drives up prices and increases reliance on food imports. The rapid urban expansion into abandoned farmland exacerbates resource competition, making land restoration efforts more difficult.

12.2. Options for legal governance mechanisms

Migration-driven land abandonment presents significant challenges to soil management and environmental sustainability. Without proper intervention, abandoned agricultural lands are vulnerable to erosion, nutrient depletion, and biodiversity loss. To prevent soil degradation and promote sustainable land use, preventive measures that support land restoration, enhance agricultural practices, and mitigate environmental pressures in both rural and urban areas are essential. Effective governance mechanisms, including policy interventions, financial incentives, and

38 Kyere-Boateng & Marek (2021).
39 Omasire (2024).

community engagement, safeguard soil health and ensure long-term environmental resilience amid land-use changes associated with migration.

12.2.1. Preventive measures for soil degradation on abandoned land

The following options are possible for preventing soil degradation due to migration:

(1) Implement soil conservation programs, incentivise land restoration, and implement specific policies addressing abandoned agricultural lands.
(2) Encouraging rural-urban linkages can help mitigate the effects of migration on both urban infrastructure and rural agricultural systems.
(3) Engaging multiple stakeholders, including local governments, NGOs, private sector actors, and migrants

To prevent soil degradation from abandoned agricultural land, governments can implement soil conservation programs that incentivise land restoration. Programs could include financial support for landowners to rehabilitate degraded land and reintroduce sustainable farming practices such as crop rotation, organic fertilisation, and agroforestry. In conflict-affected areas, international organisations and governments can collaborate to promote soil restoration and provide technical support for land regeneration. Specific policies addressing abandoned agricultural lands, such as incentivising natural regeneration or supporting the reintroduction of agriculture or agroforestry, could help mitigate the impacts of migration-driven land abandonment. Governments can offer grants or subsidies to private landowners and community groups to invest in land restoration, soil rehabilitation, and biodiversity conservation.

Governance mechanisms could focus on fostering economic opportunities in rural areas, such as through rural development programs that create jobs and reduce the need to migrate. Strengthening connections between urban and rural areas through transportation, trade, and technology can also facilitate the sustainable exchange of resources and ideas that support soil management and agricultural practices.

Create effective governance mechanisms that facilitate the integration of migrants into new areas. This includes encouraging participatory planning for land-use decisions and promoting collaboration among urban planners, environmentalists, and agricultural experts to ensure that urban and rural communities are supported in sustainably managing their land and resources.

12.2.2. Improving land use and agricultural practices

Improving land use and agricultural practices is possible through:

(1) Strengthening land tenure systems in areas experiencing migration, especially those with displaced populations.
(2) Implementing policies that grant land rights to migrants and displaced populations.
(3) Promoting sustainable agricultural practices among new migrants and existing rural populations.

In areas experiencing migration, especially those with displaced populations, strengthening land tenure systems can provide security for migrants and existing residents. Secure land tenure encourages investment in land restoration and sustainable agricultural practices. Governments can implement policies that grant land rights to migrants and displaced populations, ensuring that they can access and sustainably manage land for agricultural purposes.

Governance mechanisms can focus on promoting sustainable agricultural practices among both new migrants and existing rural populations. This includes supporting the adoption of agroecology, agroforestry, and organic farming practices. Farmers should receive education and extension services on soil management techniques that enhance soil fertility and prevent erosion. Additionally, displaced populations should be trained on sustainable farming techniques to prevent environmental degradation.

12.2.3. Reducing pressure on land in urban areas and environmental impacts

The following options are possible:

(1) Promoting integrated land-use planning at rural and urban levels to balance agricultural, urban, and environmental needs.
(2) Establishing systems for monitoring soil health and land use across rural and urban areas.
(3) Enforcement of land-use regulations and incentives for responsible practices.

Governments can promote integrated land-use planning at rural and urban levels to balance agricultural, urban, and environmental needs. This approach should include zoning regulations that prevent the over-conversion of agricultural land into urban areas, preserve agricultural land, and promote sustainable urban development that minimises soil sealing and environmental degradation. This could involve establishing urban growth boundaries and incentivising landowners to preserve rural land for agricultural purposes. Urban areas experiencing rapid migration should integrate resilience planning into their development strategies. This includes investing in green infrastructure, such as permeable surfaces, green spaces, and urban agriculture, to mitigate soil sealing and improve soil health. Urban resilience planning should also

focus on improving drainage systems and reducing flood risks by preserving the natural water cycle and ensuring sustainable waste management practices.

To reduce environmental impacts, governments can establish systems for monitoring soil health and land use across rural and urban areas. Implementing stronger environmental regulations to prevent overexploitation of land and ecosystem degradation in both host and departure regions will help address the environmental impacts of migration. Enforcement of land-use regulations and incentives for responsible practices, such as reforestation and sustainable farming, can mitigate soil degradation and preserve biodiversity.

12.3. Concrete text for legal provisions

The following is intended as a point of consideration. It outlines a potential approach to formulating a law that regulates the core elements of migration from a sustainable soil management perspective. This draft would have to be adapted to national needs and the national legislative structure.

General provisions

Objective:
This law establishes governance mechanisms, policies, and programs that prevent soil degradation, promote land restoration, and ensure sustainable land use in areas affected by migration-driven land abandonment. Engaging all relevant stakeholders in land and resource management aims to protect soil health, preserve biodiversity, strengthen rural-urban linkages, and enhance environmental resilience.

Scope:
This law applies to all public, private, and community-managed lands within the national territory affected by migration, land abandonment, or environmental degradation. It covers rural and urban areas, including abandoned farmlands, conflict-affected zones, rapidly urbanising regions, and areas designated for land-use planning, soil restoration, or biodiversity conservation. Its provisions apply to government bodies, local authorities, landowners, farmers, private sector actors, communities, migrants, and displaced populations.

Definitions:
“Soil conservation programs and land restoration” involve government-led or supported efforts to rehabilitate degraded or abandoned agricultural lands, restore soil health, and enhance biodiversity.

"Sustainable farming practices", such as agroecology, crop rotation, and organic farming, promote long-term soil productivity while minimising environmental impacts.

"Natural regeneration" supports ecosystem recovery with minimal intervention.

"Land tenure security" ensures legal protection of land rights for individuals and communities, including migrants and displaced populations.

"Integrated land-use planning and urban resilience planning" aim to balance rural and urban development, prevent environmental degradation, and strengthen resilience through Green Infrastructure and sustainable land management.

"Rural-urban linkages" promote resource exchange and development synergies.

"Biodiversity conservation" ensures ecosystem balance

"Participatory governance" guarantees inclusive decision-making involving all stakeholders, including government, communities, private actors, and vulnerable groups.

Soil conservation and land restoration programs:

(1) The state shall establish and implement Soil Conservation Programs to restore degraded and abandoned agricultural lands and prevent further soil degradation. These programs shall include:
   (a) Financial grants or subsidies to landowners, farmer groups, and community organisations for soil rehabilitation, restoration, and biodiversity conservation projects.
   (b) Promote sustainable farming practices, including crop rotation, organic fertilisation, and agroforestry, to improve soil health and productivity.
   (c) Support natural regeneration policies, allowing abandoned lands to recover naturally or by reintroducing sustainable agriculture or agroforestry.
(2) In conflict-affected areas, the state shall collaborate with international organisations to provide technical assistance and financial resources for soil regeneration and sustainable land management.

Strengthening rural-urban linkages and economic resilience:
The state shall implement rural development programs to create employment opportunities, reduce migration pressures, and support sustainable land management in rural areas.

Measures shall include:

(1) Strengthening transportation, trade, and technological connections between urban and rural areas to support sustainable resource exchange and soil management practices.
(2) Encouraging stakeholder engagement, including local governments, NGOs, private sector actors, and migrant communities in decision-making processes.
(3) Promoting participatory land-use planning, ensuring collaboration between urban planners, environmentalists, and agricultural experts to balance land use and resource management.

Secure land tenure and sustainable agricultural practices:

(1) The state shall guarantee secure land tenure rights for migrants, displaced populations, and local communities to encourage investment in land restoration and sustainable agricultural practices.

Land tenure systems shall:

(2) Provide legal agricultural land access for migrants and displaced populations, promoting self-reliance and environmental sustainability.
(3) Support adopting sustainable agricultural methods through targeted policies and programs, including agroecology, agroforestry, and organic farming.
(4) Ensure access to education and extension services on soil management, fertility enhancement, and erosion control techniques for all farmers, including displaced populations.

Integrated land-use planning and urban resilience:
The state shall promote integrated land-use planning at rural and urban levels to balance agricultural, urban, and environmental needs.

Measures shall include:

(1) Enacting zoning regulations and urban growth boundaries to preserve agricultural lands, limit urban sprawl, and prevent excessive land conversion.
(2) Offering financial incentives to landowners who preserve rural land for agriculture rather than urban development.
(3) Integrating urban resilience planning into migration-affected urban areas, including investments in green infrastructure such as permeable surfaces, green spaces, and urban agriculture, improved drainage systems to mitigate flood risks and preserve the natural water cycle, and sustainable waste management practices to protect soil and water resources.

Monitoring, environmental protection, and biodiversity conservation:

(1) The state shall establish monitoring systems to assess soil health and land-use changes across rural and urban areas.
(2) Environmental regulations shall be strengthened to prevent land overexploitation, ecosystem degradation, and biodiversity loss.
(3) The state shall promote reforestation, ecosystem restoration, and sustainable farming practices through financial incentives and legal obligations to ensure long-term environmental resilience and biodiversity preservation.

Multi-stakeholder involvement and participatory governance:

(1) All relevant stakeholders, including local governments, community groups, NGOs, private sector actors, migrants, and displaced populations, shall be involved in the planning, implementing, and monitoring land-use and soil conservation programs.
(2) Participatory governance mechanisms shall ensure transparency, inclusiveness, and accountability in land and soil resource decision-making processes.

13. Commentary XII: Pesticides

The use of pesticides in Africa plays a crucial role in safeguarding crops and enhancing agricultural productivity, thereby contributing significantly to food security and economic stability across the continent. However, the safe and effective management of pesticides remains a challenge due to varying national regulations, economic disparities, and limited access to training, safety equipment, and monitoring systems. Misuse or overuse of pesticides can lead to severe environmental damage, health risks to soil, animals, and humans, and socio-economic consequences for farmers and communities. While pesticides are crucial for boosting crop yields and ensuring food security in Africa, their misuse can pose food safety risks[40] and negatively affect soil microbiota, structure, composition, and fertility. This impact includes disruptions to nutrient availability and absorption for plants.[41]

Recognising these challenges, African countries have taken steps to improve pesticide management, notably through the Policy for the Harmonisation of Pesticide Registration in Africa.[42] Developed in 2012, this policy seeks to establish a unified framework for pesticide registration, strengthen regulatory systems, and promote cooperation among member states. Harmonised registration processes ensure that only

40 See https://www.ipcc.ch/site/assets/uploads/sites/4/2022/11/SRCCL_Chapter_5.pdf, accessed 7 April 2026.

41 Navshree et al. (2025).

42 See https://auiapsc.org/2012/04/15/harmonization-of-pesticides-registration-in-africa-2012/, accessed 29 September 2025.

safe and effective pesticides are used, reducing regulatory duplication, facilitating trade, and supporting sustainable agricultural development.

Strengthening legislation, monitoring, and enforcement remains essential for controlling pesticide quality, use, labelling, and distribution, ultimately protecting soil, animal, and human health, as well as ecosystems, and advancing Africa's agricultural sector. This Commentary aims to analyse the challenges of pesticide use in Africa and to explore policy options to improve pesticide management and achieve sustainable soil management.

13.1. Challenges

Smallholder farmers in many African countries face significant challenges in accessing quality pesticides, leading to reliance on counterfeit products, ineffective pest control, and environmental and health risks. Weak regulations, poor waste management, pest resistance, limited adoption of sustainable alternatives, and logistical barriers further threaten agricultural productivity and food security.

13.1.1. Limited access to quality pesticides

Approved pesticides are often too expensive for most African farmers, forcing them to rely on more affordable but unregulated alternatives. These low-cost options are often counterfeit or of poor quality, providing minimal pest protection while posing significant risks to crops, the environment, and human health.[43] As a result, African farmers remain vulnerable to crop losses despite their efforts to control pests. The high cost of certified pesticides also fuels the smuggling of illegal chemicals, further undermining agricultural productivity and threatening food safety and environmental sustainability. Poor import and distribution mechanisms exacerbate access to pesticides, particularly in landlocked countries. Indeed, high transportation costs, inadequate storage facilities, and weak distribution networks drive up prices of quality pesticides and may lead to shortages, especially during peak agricultural seasons.

13.1.2. Lack of regulation and oversight

Weak regulatory institutions in many African countries contribute to the widespread importation and sale of unapproved or banned pesticides. Insufficient enforcement mechanisms enable the illegal trade of pesticides to flourish, exposing farmers and

43 Kassem et al. (2021).

consumers to hazardous chemicals and undermining sustainable agriculture. The unapproved pesticides from illicit markets, which often bypass safety regulations, may harm soil health. Penal law and sanctions are needed to prevent the continuation of illegal markets. At the same time, regional bodies such as the Sahelian Committee of Pesticides and the East African Community oversee pesticide regulation.[44] These institutions often struggle with resource constraints and limited institutional support, hindering their ability to effectively monitor and control the distribution of hazardous chemicals. Additionally, the lack of governance over pesticide waste is a critical issue in many African countries. Farmers, especially in rural areas, often lack the infrastructure, resources, and awareness to dispose of pesticide containers safely. Pesticide misuse and improper waste management lead to severe environmental consequences, including soil degradation, water contamination, biodiversity loss, long-term health risks for farming communities, and an increased potential for pest resistance. In some cases, farmers suffer pesticide-related illnesses due to direct exposure.[45]

13.1.3. Lack of ecological alternatives and capacity building

The lack of environmental alternatives to chemical pesticides and the insufficient capacity building for farmers in most African countries reinforce the continued reliance on harmful pesticide practices. While integrated pest management strategies and biopesticides are promoted as sustainable alternatives, their adoption remains limited. This is primarily due to the immediate effectiveness of chemical pesticides, which are widely regarded as the most reliable solution for pest control, delivering quick results despite their significant long-term environmental and health consequences. The lack of ecological alternatives is further exacerbated by insufficient training on the safe use of pesticides[46] and the unavailability of reliable, accessible ecological options. The absence of effective training programs and support systems for farmers exacerbates the risks of pesticide overuse and misuse. For instance, many farmers are unaware of the benefits of integrated pest management or biopesticides and lack the technical support to implement these methods effectively. Additionally, limited access to information, resources, and technology hinders farmers' ability to transition from chemical-based practices to more sustainable alternatives. Furthermore, research institutions often lack the necessary scientific equipment and financial resources to develop cost-effective, efficient alternatives to chemical

44 See https://insah.cilss.int/du-csp-au-coahp/ and https://www.eac.int/documents/category/pesticides, accessed 29 September 2025.
45 Anderson & Isgren (2021).
46 Naré et al. (2015).

pesticides, thereby hindering the development and accessibility of ecological solutions.

13.2. Options for legal governance mechanisms

Effective legal governance mechanisms are crucial for enhancing pesticide management in Africa, ensuring the safe use of pesticides while safeguarding human health and the environment. Strengthening national legislation, harmonising regional regulations, enforcing pesticide registration requirements, and establishing waste management laws are key measures to enhance oversight, reduce risks, and promote sustainable agricultural practices across the continent.

13.2.1. Improving accessibility to quality pesticides

The following key options can improve accessibility to quality pesticides:

(1) Implementation of legal governance mechanisms plays a vital role in improving access to high-quality pesticides in African countries, ensuring that their production, distribution, and use are safe, sustainable, and comply with international standards.
(2) Developing fair pricing policies to ensure quality pesticides are affordable for smallholder farmers.
(3) Developing a partnership between governments and the private sector to enhance accessibility.
(4) Harmonising pesticide regulations through regional organisations can help ensure consistency and alignment across member states.

Pesticides must undergo registration for approval, including toxicological testing and environmental impact assessments, to ensure safety. This process is crucial for protecting human health and the environment. Governments should establish regulations that set pesticide quality standards, such as maximum residue limits in food, and ensure compliance with international safety standards. For instance, all pesticides must be registered with a national regulatory authority, undergo thorough testing to ensure safety and efficacy, and minimise risks associated with harmful or ineffective products. It is necessary to ensure that farmers, particularly in rural areas, can access quality products while preventing counterfeit pesticides from entering the market.

Legal frameworks should ensure affordable access to quality pesticides, with subsidies or support programs for low-income farmers and measures to prevent price manipulation.

Governments should liaise with private-sector stakeholders and offer incentives to expand access to high-quality pesticides, particularly in underserved regions. It should encourage local pesticide production to help reduce import dependence, promote job creation, and ensure pesticides meet local needs.

Regional collaboration, particularly through bodies such as the African Union and the Regional Economic Communities (RECs), can help align pesticide regulations across countries, ensure consistent standards, and facilitate trade. Legal frameworks should regulate the cross-border movement of pesticides, ensuring the safe and controlled trade of products through customs checks and international partnerships to prevent the spread of substandard pesticides.

13.2.2. Improving regulation and oversight

Options for improving the regulation and oversight of pesticides involve:

(1) Developing and implementing dedicated national legislation on pesticides to control hazardous pesticides and regulate waste and packaging.
(2) Developing soil-related environmental standards to avoid the contamination of soils using pesticides.
(3) Establishing comprehensive monitoring systems to track pesticides throughout their lifecycle.
(4) Harmonising pesticide regulations at the regional level to maintain consistent safety standards across borders.

Control of Pesticide Distribution and Sales regulates pesticide distribution by granting licences only to companies that meet strict safety and quality standards. One key measure is the strict control of pesticide distribution to prevent the introduction of counterfeit or non-compliant products. Governments can strengthen this control by imposing quotas or restrictions on the import of hazardous or outdated pesticides. This should be established through specific national legislation on pesticides. Control of Hazardous Pesticides involves banning or strictly limiting the use of highly hazardous pesticides to protect human health and the environment. Regulation of Waste and Packaging involves establishing laws for the proper disposal of pesticide containers and residues to prevent environmental contamination.

Monitoring and Traceability is a robust monitoring system that should track pesticides from production to use, ensuring compliance with safety guidelines. Governments must implement monitoring mechanisms and sanctions to enforce compliance through inspections and audits, with severe penalties for violations, including fines and imprisonment. Regional coordination and harmonisation aims to harmonise pesticide regulations across member countries of regional bodies, promote consistent safety standards, and facilitate trade.

13.2.3. Strengthen ecological alternatives and capacity building

The following options are possible:

(1) Promoting sustainable agricultural practices by offering subsidies and incentives for pesticide alternatives.
(2) Encouraging research into and the development of environmentally friendly pest control methods.
(3) Implementing training and certification programs.

The government's role in promoting sustainable practices is to foster sustainable agriculture by offering subsidies and incentives to adopt alternatives to chemical pesticides, such as biopesticides and integrated pest management (IPM). These mechanisms support a transition toward more environmentally friendly and health-conscious pest control methods. By providing financial support for these alternatives, governments reduce the reliance on harmful chemical pesticides, benefiting public health and the environment.

Training and certification programs are to ensure the safe and responsible use of chemicals. Governments can establish certification programs that require individuals to demonstrate an understanding of best practices, correct dosage application, and the potential health risks associated with pesticide use. These programs can help ensure that only qualified personnel handle pesticides, thus minimising risks to human health and the environment.

Encouraging research and adoption of alternatives involves supporting research into alternative pest control methods that are less harmful to the environment and human health. Policies can be introduced to fund research in biopesticides and other sustainable agricultural techniques. Such measures can foster innovation in pest management, creating safer options for farmers and reducing the long-term environmental impacts of pesticide use.

13.3. Concrete text for legal provisions

This proposal is intended as a point of consideration. It outlines a potential approach to formulating a law that regulates the core elements of pesticide governance. This draft would need to be adapted to national needs and the national legislative structure.

General provisions

Objective:
This law establishes governance mechanisms to regulate, distribute, and use pesticides, ensuring safety, sustainability, and compliance with international standards.

Responsible pesticide management protects human health, preserves the environment, and promotes agricultural productivity.

Scope:
This framework governs the entire lifecycle of pesticides, including their production, importation, exportation, sale, and use, ensuring strict oversight from market entry to application. It establishes explicit authorisation and registration processes to verify product safety and efficacy before distribution. Additionally, it mandates robust monitoring and enforcement mechanisms to prevent non-compliance and mitigate risks associated with pesticide use. Proper waste management regulations are enforced to prevent environmental contamination from residues and packaging. Furthermore, the framework promotes training and certification programs to ensure pesticide handlers apply best practices. Lastly, it encourages the adoption of sustainable pest control alternatives to reduce reliance on harmful chemical pesticides and support environmentally friendly agricultural practices.

Definitions:

Key terms in this framework define essential concepts for effective pesticide regulation and management.

A "pesticide" refers to any substance used to prevent, destroy, or control pests, while a biopesticide is derived from natural sources, offering a more sustainable alternative.

"Integrated pest management" (IPM) combines various pest control methods to minimise environmental and health risks.

"Registration" is the approval process that ensures pesticides meet safety and efficacy standards before market entry.

"Counterfeit" pesticides are mislabelled or fail to comply with safety regulations.

"Certification" means officially recognising individuals or entities that adhere to proper pesticide handling practices.

"Residue limits" mean the maximum allowable pesticide residues in food to protect consumer health.

"Hazardous pesticides" pose or cause significant risks to human health or the environment, requiring strict regulation or prohibition.

"Sustainable alternatives" refer to all other options that promote eco-friendly pest control methods, reducing reliance on synthetic chemicals.

The "regulatory authority" is the designated body overseeing pesticide compliance, enforcement, and safety measures.

Quality control and distribution

(1) Pesticides must comply with national and international safety standards, including maximum residue limits in food and environmental safety benchmarks.
(2) The distribution and sale of pesticides shall be restricted to licensed entities that meet regulatory requirements.
(3) Importing hazardous or obsolete pesticides is prohibited unless authorised for specific scientific or environmental remediation purposes.
(4) Measures shall be taken to prevent counterfeit pesticides from entering the market, including regular inspections and strict enforcement of licensing requirements.

Affordability and accessibility

(1) Governments shall implement policies to ensure that high-quality pesticides remain affordable, including subsidies and financial support for smallholder farmers.
(2) To reduce dependence on imports, incentives and regulatory support shall be provided to promote local pesticide production.
(3) Regional cooperation mechanisms shall be established to harmonise pesticide regulations, ensure uniform safety standards, and facilitate trade.

Regulation of hazardous pesticides

(1) Highly hazardous pesticides (HHPs) shall be subject to strict control, with potential bans or phased-out use where safer alternatives exist.
(2) The government shall promote the adoption of integrated pest management (IPM) and biopesticides through policy incentives and research funding.
(3) Public awareness campaigns shall educate farmers and consumers on the risks of hazardous pesticides and the benefits of ecological alternatives.

Waste management and environmental protection

(1) The disposal of pesticide containers and residues shall be regulated to prevent environmental contamination.
(2) Manufacturers and distributors shall be required to implement take-back programs for used pesticide containers.
(3) Pesticide application near water sources, protected areas, and sensitive ecosystems shall be subject to stringent environmental safeguards.

Capacity building and certification

(1) All pesticide applicators must undergo mandatory training and obtain certification before handling or applying pesticides.

(2) Certification programs shall include best practices for pesticide application, risk mitigation, and safety precautions.
(3) Governments shall collaborate with research institutions and private stakeholders to promote education and capacity-building initiatives in sustainable pest management.

Monitoring, compliance, and sanctions

(1) A national monitoring system shall be established to track pesticides from production to end-use, ensuring compliance with regulatory standards.
(2) Regular inspections and audits shall be conducted to verify adherence to pesticide handling and application safety protocols.
(3) Violations of pesticide regulations, including the sale of counterfeit or banned pesticides, shall be subject to strict penalties, including fines, licence revocation, and legal action.

14. Commentary XIII: Pastoralism

Livestock and agricultural systems have a profound influence on soil fertility across Africa. The continent hosts fifteen distinct farming systems, with rain-fed cropping and pastoralism being the most prevalent.[47] Trees and shrubs also play essential roles in many of these systems. Pastoralism—derived from the Latin word pastor, meaning herder—is characterised by mobility, rangeland use, and a reliance on livestock, particularly cattle. This extensive form of pastoralism is primarily practised in arid and semi-arid regions with limited access to infrastructure and services. It typically combines livestock rearing with dryland cropping. Pastoralists in Africa number approximately 268 million people, accounting for more than a quarter of the continent's population, and occupy around 43% of Africa's total land area.[48] However, climate change and population growth have led to a decline in per capita access to livestock and land resources. These pressures, if left unchecked, are likely to exacerbate soil degradation, environmental inequality, and vulnerability among pastoralist communities. This Commentary analyses the role of pastoralism in soil governance, identifies its legal and ecological challenges, and proposes legislative options and model provisions to support sustainable pastoral land management.

47 Dixon et al. (2020).
48 FAO (2018: 1).

14.1. Contextualising pastoralism

Pastoralism in Africa serves as both a livelihood strategy and a production system for many communities residing in arid and semi-arid regions. These areas are marked by considerable spatial and temporal variability in rainfall, often resulting in unpredictable and uneven distribution of grazing resources. In response, pastoralists strategically employ livestock mobility to optimise access to available forage and water. Mobility—often seasonal—is a defining characteristic of pastoral systems, enabling resilience in the face of environmental uncertainty. However, movement patterns vary depending on local ecological conditions, land tenure systems, and the types of livestock reared. This dynamic adaptation highlights the importance of flexible land-use governance and supportive policies in sustaining pastoralism in a changing climate. Pastoral regions in Africa are found in the following natural zones:

(1) the Mediterranean and Saharan zone in North Africa, spanning from Morocco in the west to Egypt in the east, including Algeria, Tunisia, and Libya;
(2) the sub-Saharan tropical and equatorial zone, extending from the edges of the Sahara Desert in the north to the Kalahari Desert in the south; and
(3) the southern zone, encompassing Namibia, Botswana, Zimbabwe, Mozambique, Swaziland, Lesotho, and South Africa.

14.2. Challenges

The identified natural zones exhibit distinct soil characteristics that shape the implications of pastoralism and its associated challenges, varying from one region to another. However, the predominant challenge in pastoralism remains land degradation, primarily driven by social and economic factors such as poverty, population growth, inadequate governance and political representation, and restricted land rights and access.

The laws, legislative frameworks, and strategies across Africa differ significantly. No specific pastoral policies or regulations in southern Africa explicitly address pastoral land tenure issues. In contrast, governments in West and East Africa have enacted several pastoral laws to safeguard pastoral land and facilitate livestock mobility. Despite these efforts, existing pastoral laws across the continent often fail to address soil-related issues associated with pastoralism. Even the African Union's Policy Framework for Pastoralism in Africa: Securing, Protecting, and Improving the Lives, Livelihoods, and Rights of Pastoralist Communities (2010) does not address soil-related issues in pastoralism.

14.3. Options for legal governance mechanisms (policies and institutions)

Many global, regional, and national policies affect the pastoral farming system. Critical among these policies are governance and political participation (including security), economic development (agriculture, livestock, and markets), natural resources (including land biodiversity and water), and development cooperation (including aid and humanitarian assistance). Inappropriate policies and developmental interventions favoured crop-based agriculture and sedentary livestock production in the past. This inappropriateness has stemmed from a lack of pastoralists' participation and influence in decision-making. In recent years, policies have shown renewed support for pastoralism. Policy attention is also increasingly focusing on conservation and rangeland ecosystems, facilitating transboundary livestock movement, and promoting inclusiveness in the local policy process. In this vein, the proposed legislative intervention is meant to promote sustainable pastoralism.

14.3.1. Option 1: reforming existing soil laws to include management of pastoral lands

This legislative proposal recommends enhancing current soil legislation by incorporating measures to prevent, mitigate, or manage soil erosion on both arable and pastoral lands, tailored to each country's specific conditions. It also advocates reforming existing pastoral land management laws to integrate sustainable soil management practices. Integrating pastoral issues into existing soil legislation, and *vice versa*, enables a comprehensive approach to sustainable soil management.

14.3.2. Option 2: introducing pastoral land management law

This option entails enacting separate pastoral land management laws to address the administration of pastoral land (access), establishing mechanisms to achieve sustainable use of soil in pastoral lands, developing grazing management mechanisms, clarifying the responsibilities of pastoralists and the government, and implementing rangeland condition monitoring. Existing regional treaties/protocols, such as the ECOWAS Protocol on Transhumance, 1998, and Nouakchott Declaration on Pastoralism, 2013, and the African Union Policy Framework for Pastoralism in Africa: Securing, Protecting, and Improving the Lives, Livelihoods, and Rights of Pastoralist Communities, 2010, may be considered as building blocks towards achieving sustainable pastoralism.

14.4. Proposed legal text and annotations

Definitions
"Pastoral lands" refer to the use and management of resources that allow animal husbandry. They include areas of natural vegetation such as savannah and forest, as well as agricultural lands where the animals are put to common grazing after the harvest.

Objectives
The objects of the laws are as follows:

(1) to ensure that all pastoral land is well managed and utilised prudently and
(2) to provide for—
    (a) the effective monitoring of the condition of pastoral land;
    (b) the prevention of degradation of pastoral lands;
    (c) the rehabilitation of the land in cases of damage;
(3) to provide a form of tenure of state land / communal / tribal land for pastoral purposes; and
(4) to provide the community with a system for accessing pastoral lands.

General duties
A pastoralist shall carry out pastoral activities in accordance with good land management practices; prevent degradation of the land and soil resources; and endeavour, within the limits of financial resources, to improve the condition of the land and soil.

Conditions for access to pastoral lands

(1) The competent authority shall, upon application [by a community or individual], grant access to pastoral lands.
(2) A permission or authorisation to access pastoral lands shall be subject to the following land management conditions, providing for—
    (a) an obligation to ensure that the number of stocks on the land or a particular part of the land does not exceed the maximum levels specified in the law, except with the prior approval of the competent authority;
    (b) an obligation to maintain existing constructed stock watering points in proper working order; and
    (c) an obligation to close off specified areas on the land, or to close or move specified access points on the land, to rehabilitate degraded land.

Destocking[49]
If the competent authority is of the opinion that pastoral land has, from any cause, been damaged, or is likely to suffer damage or deteriorate, and that to prevent, arrest or minimise damage to or deterioration of the land and soil, or to rehabilitate the land or soil, it is necessary that action under this section be taken, the competent authority may, by notice in writing to the [pastoralist/occupier of the pastoral land], require him/her to do any one or more of the following:

(1) remove a specified number of stocks from the land or a particular part of the land;
(2) keep the amount of stock on the land or a particular part of the land to a specified level, or to keep no stock at all on that land;
(3) carry out specified improvements on the land; and
(4) adopt or desist from specified land management practices, in accordance with the terms of the notice.

15. Commentary XIV: Urbanisation

Africa is experiencing unprecedented urban growth, which is rapidly reshaping its landscapes and resource bases. While urbanisation offers potential avenues for economic development and improved living standards, it also presents significant environmental challenges, particularly regarding soil and land degradation. Urbanisation refers to the growing concentration of population in urban areas, which drives land-use changes and often leads to soil degradation from infrastructure development and waste accumulation. This Commentary analyses urbanisation in Africa as a major driver of soil and land degradation and proposes solutions for addressing the numerous challenges.

49 Most pastoral lands are managed communally due to the unpredictability of resources and the need for mobility. Policies that shift toward individualised land use tend to lead to conflict and environmental degradation. In contrast, when governments support communal land tenure, pastoral communities benefit. Therefore, to ensure sustainable land and soil management, it is essential to recognise communal land rights. This Commentary does not propose full legislative text for every component of pastoral land management laws. The suggested provisions can be incorporated into soil and pastoral land management legislation. It is essential to assign specific responsibilities to pastoral land users, particularly the obligation to prevent land and soil degradation. Overstocking is a major challenge on pastoral lands, underscoring the need to maintain livestock numbers within the lands' carrying capacities.

15.1. Description of challenges

Globally, future urban area expansion is expected to cause significant food production losses, reduce biodiversity, and increase land-use change emissions, jeopardising human livelihoods and the natural environment. As of 2023, Africa is highly urbanised, with Gabon the most urbanised African country at 90%, followed by Djibouti, Libya, São Tomé and Príncipe, and Algeria, all with over 75%. At the lowest scale of urbanisation in Africa are countries such as Malawi, Rwanda, Niger, and Burundi, which have less than 20% urbanisation. The rest of the African countries, such as South Sudan, have urbanisation rates ranging from 21% to 40%; while most countries, such as Equatorial Guinea, Botswana, South Africa, Morocco, Cameroon, Ghana, Namibia, Zambia, Madagascar, and others, remain within the higher rates of 41% to 74%.[50]

Urbanisation, in its narrower sense, refers to the increasing proportion of a population residing in urban areas. It typically results from rural-to-urban migration, as individuals relocate from the countryside to towns and cities in search of better economic opportunities, services, and living conditions.[51] The broader perspective of urbanisation incorporates "all the social, economic, biophysical and institutional changes that result from and accompany urban growth."[52] With urbanisation comes industrialisation and infrastructural development, which are necessary for economic growth. Although urbanisation is highly correlated with economic development, it does not necessarily cause it.

Urbanisation has diverse effects on the environment. For instance, on the African continent, one of the fastest urbanising regions, food systems are also transforming rapidly. This puts immense pressure on food security in the world's most food-insecure region.

Further, rapid and unplanned urbanisation presents a significant challenge in Africa. Projections indicate that by 2050, over 60% of Africa's population will live in urban areas, up from approximately 40%.[53] These high levels of urbanisation also pressure the government to secure land for new settlements, sometimes at the expense of land designated for ecological preservation, such as forests and other protected areas, which are crucial for soil health and overall environmental regeneration.

Among other challenges, urbanisation in Africa has largely translated into the establishment of slums, increased poverty, and widening inequalities. A definitional appraisal of "urban sprawl" has established that the term covers six categories: pattern, process, nature, location, actors, and factors.[54] While urbanisation may drive economic

50 Statista (2023); OECD (2025a).
51 Smit (2021).
52 Ibid.
53 OECD (2025a).
54 Dadashpoor & Shahhossein (2024).

development, alter the urban form, and influence production technologies, citizen lifestyles, and societal values, it can also negatively impact social equity, public health, and the physical and natural environment, specifically soil, air, and land, thereby increasing pollution and related diseases.

Consequently, rapid urban population growth intensifies human activities and accelerates environmental degradation, such as soil depletion. In Africa, rapid urbanisation is responsible for converting forests and wetlands into residential, industrial, and agricultural zones, stressing ecosystems and increasing soil vulnerability.

Urbanisation and infrastructure development often progress in tandem, placing immense pressure on soil resources. One of the most critical consequences is the loss of fertile soils through soil sealing—the covering of land with impermeable materials such as concrete and asphalt for buildings, roads, and other infrastructure. This process permanently impairs the soil's ecological functions. Furthermore, many African cities have historically been established on prime agricultural land, intensifying the challenge. As urban areas expand, valuable land and fertile soils are lost, reducing the availability of arable land for food cultivation and threatening long-term food security.

Rapid and unplanned urbanisation, accompanied by a growing human population and other associated anthropogenic activities in Africa, is also generating large amounts of waste, leading to problems with waste disposal and management. In most African countries, the most common practices of waste processing and management include landfilling, incineration, unscientific dumping, and vermi-composting. The first three of these methods pose drawbacks to soil sustainability, including soil and groundwater contamination, environmental pollution from biomass burning, and impacts on human health and environmental hygiene. For these reasons, when African governments formulate urbanisation policies, it is essential to strike a balance between economic, social, and ecological considerations by integrating health-oriented and sustainable soil governance measures.

Africa's soils face mounting threats from a waste management crisis driven by rapid urbanisation, inadequate infrastructure, and weak regulatory enforcement. Uncontrolled dumping and widespread contamination are prevalent, particularly in rapidly growing cities that are ill-equipped to manage the increasing volumes of municipal, industrial, and hazardous waste, including e-waste. Limited recycling capacity and the absence of circular economy strategies further exacerbate the situation. Financial constraints and public disengagement hinder progress, while climate change–induced disasters accelerate the spread of pollutants. A coordinated and urgent response is required, one that includes robust regulatory frameworks, targeted infrastructure investments, public education campaigns, and international cooperation, to safeguard Africa's critical soil resources and ensure long-term environmental resilience.

The escalating volume of waste across Africa poses a serious environmental threat, requiring urgent, sustainable management strategies to prevent widespread soil contamination. Rapid urbanisation, industrial expansion, and evolving consumption patterns have led to an unprecedented increase in solid and hazardous waste. Traditional disposal practices, such as open dumping and poorly regulated landfills, expose soils to significant risks. Leachates from these sites, containing heavy metals, pathogens, and other pollutants, infiltrate the soil, compromising fertility, agricultural productivity, water quality, and public health. To address this, implementing integrated waste management systems is essential. These should prioritise waste reduction, recycling, and the safe treatment and disposal of hazardous materials. Additionally, promoting circular economy principles, where waste is reimagined as a resource, can substantially reduce soil contamination while contributing to broader sustainability goals across the continent.

Healthy soils also form the foundation of adequate green infrastructure, offering vital ecosystem services that help buffer the impacts of rising temperatures and extreme weather events. This is especially critical in urban environments, where the urban heat island effect significantly amplifies climate-related health risks. Soils' capacity to sequester atmospheric carbon dioxide and support vegetation helps regulate temperature, while their ability to absorb and store water reduces flood risks and enhances drought resilience. Moreover, structurally intact soils prevent erosion and support slope stability during severe weather events, while their biodiversity underpins ecosystems that are more resilient to environmental stress.

Investing in soil health, therefore, is not merely an environmental priority; it is an essential strategy for building climate-resilient, sustainable urban and rural landscapes that can withstand the escalating challenges of the 21st century.

15.2. Options for legal governance mechanisms

Various legal governance mechanisms can be employed to effectively address soil and land degradation driven by urbanisation in African countries. These mechanisms focus on regulating land use, encouraging sustainable practices, and enforcing environmental protection. The key options include:

(1) Upgrading informal settlements by providing integrated infrastructure and services that target marginalised groups, including the poor, youth, women, and the elderly. African governments should act proactively to ensure orderly urban development by defining and implementing clear urban development strategies.

(2) Mobilising urban financing from local and foreign investors and ensuring these resources are efficiently and adequately allocated between central and local governments' urban projects in Africa.

(3) Improving human capital through equal access to education and healthcare services and facilities for all categories of citizens to meet labour market needs across Africa.
(4) Diversification of economic activities in African countries by creating new economic hubs oriented towards high sustainable and value-added production and exportation. These reforms should be more inclusive to ensure that all categories of citizens, regardless of their age, race, gender, ethnicity, or socio-economic conditions, have equal access to adequate housing, basic infrastructure and services, and equal job opportunities.
(5) Urbanisation in Africa is necessary, but must be strategically planned and managed, utilising practical local and international urban and land-use planning tools and adhering to relevant legislation. In this context, several key technical proposals are recommended:
    (a) The establishment of effective national solid waste management policies.
    (b) Creation of viable institutional, legal, and financial frameworks tailored to different levels of governance.
    (c) Update respective country urban laws and policies to consider soil-specific sustainability.
(6) Dedicated care for urban soils and infrastructure in Africa:
    (a) Urban infrastructure – careful management of gardens, parks, and lawns, bioretention systems, and green roofs;
    (b) Urban agriculture; and
    (c) Urban forestry.
(7) Land planning is the first tool for reducing the impacts of urbanisation on soils by preventing higher-quality soils from sealing; implementing compensation measures such as urban greening and de-sealing; and mitigating the loss of ecosystem services provided by soils, reducing the degree of imperviousness. Containment of urban expansion is unlikely, especially in developing countries. Moreover, although promoting dense urban development can reduce built-up areas and many additional externalities (e.g., transport-related carbon emissions), it entails significant trade-offs with critical urban ecosystem services, such as the loss of green spaces, thereby reducing overall urban sustainability. Therefore, considering land use alongside urban ecosystem services and biodiversity, land planning should always be tailored to the specific area or region in Africa.
(8) Soil de-sealing can help compensate for what was sealed during urbanisation and the regeneration and reuse of so-called brownfield sites. Outside Europe, soil de-sealing has been employed mainly in North America, including in several examples of the re-naturalisation of brownfields. However, if this option is pursued in high-income, high-density African countries where available land for further urban development is relatively scarce, the cost of

the practice could be high due to the likely need for decontamination. Additionally, de-sealing is unlikely to compensate for the quantitative loss of land, given the urban growth rate.

(9) To effectively combat soil contamination from escalating waste in Africa, a comprehensive legal framework is essential, encompassing national and local waste management laws, Extended Producer Responsibility schemes, stringent landfill and hazardous waste regulations, circular economy promotion, community involvement, robust enforcement, and international cooperation. This multi-faceted approach prioritises waste reduction, recycling, and safe disposal, ensuring environmental protection and sustainable development through clear standards, monitoring, and collaborative efforts.

(10) Healthy soils are critically important in urban areas for adapting to climate change, particularly increased temperatures, droughts, and heavy rainfall events. Town planning that integrates sufficient green and blue regions and practical management tools can significantly enhance urban resilience.

Town planning for green and blue areas:

(1) Green infrastructure integration:
   (a) Incorporate parks, green roofs, walls, urban forests, and community gardens into urban planning.
   (b) Preserve and restore existing natural areas within cities.

(2) Blue infrastructure integration:
   (a) Create and restore wetlands, ponds, rain gardens, and permeable pavements to manage stormwater and enhance water infiltration.
   (b) Daylight buried streams and rivers to restore natural water flow and ecological functions.

(3) Connectivity:
   (a) Establish green corridors and networks to connect green and blue areas, promoting biodiversity and facilitating wildlife movement.
   (b) These corridors also allow for the movement of people, reducing the heat island effect.

15.3. Explanations of different options

Land use planning and zoning: Implementing regulations to demarcate zones for urban growth, agriculture, and conservation, controlling sprawl, and protecting sensitive areas. This requires strong local governance, public involvement, and robust enforcement.

Environmental Impact Assessments (EIAs): Mandating EIAs for development projects to evaluate and mitigate soil and land impacts, ensuring sustainable practices and accountability. As entailed in the Model Law, the EIA shall entail a specific "soil impact assessment" (Article 14 Model Law). This necessitates clear guidelines, competent assessors, and public access to information.

Soil and land conservation laws: Enacting laws to protect soil, regulate extractive industries, and promote conservation, preventing erosion and maintaining fertility. This demands effective enforcement, public awareness, and incentives for sustainable land management.

Waste management regulations: Developing and enforcing rules for waste disposal to prevent contamination, encourage recycling, and ensure safe handling of hazardous materials. This requires infrastructure investment, public education, and regulatory compliance.

Water resources management: Implementing laws to regulate water use, protect quality, and promote conservation, preventing degradation and ensuring equitable access. This requires inter-sectoral coordination and stakeholder involvement.

Urban agriculture regulations: Promoting sustainable urban farming practices to enhance food security and soil health. This requires technical support, land access, and integration with urban planning.

Enforcement and compliance: Establishing strong mechanisms for monitoring, inspections, and penalties to enforce environmental laws. This requires funding, trained personnel, and transparent legal processes.

Community participation: Encouraging community involvement in planning and enforcement to enhance local ownership and ensure policy relevance. This requires capacity building and access to information.

Regional and international cooperation: Fostering collaboration to address transboundary issues and share best practices. This requires participation in agreements and partnerships with international bodies.

15.4. Management tools for climate adaptation in urban areas

Soil health management:

- Promote using compost and organic matter to improve soil structure and water-holding capacity.
- Implement soil remediation techniques to address contamination.
- Regulate the use of heavy machinery in urban green spaces.

Water-sensitive urban design (WSUD):

- Integrate WSUD principles into urban development to manage stormwater and enhance water conservation.

- Utilise permeable pavements, rain gardens, and constructed wetlands to reduce runoff and improve water quality.

Urban forestry management:

- Develop urban forestry plans that select climate-resilient tree species and promote tree canopy cover.
- Implement tree maintenance programs to ensure tree health and longevity.

Early warning systems:

- Establish early warning systems for extreme weather events, such as heat waves, floods, and droughts.
- Develop emergency response plans to mitigate the impacts of these events.

Climate modelling and risk assessment:

- Conduct climate modelling and risk assessments to identify vulnerable areas and prioritise adaptation measures.
- Use data-driven approaches to inform urban planning and decision-making.

Community engagement:

- Engage local communities in the planning and implementation of climate adaptation measures.
- Promote public awareness and education on the importance of healthy soils and green infrastructure.

Policy and regulation:

- Create and enforce policies that protect urban soils.
- Incentivise green building practices.
- Regulate waste disposal to prevent soil contamination.

15.5. Concrete text for legal provisions

The following outlines concrete legal provisions that could be incorporated into legislation addressing soil and land degradation driven by urbanisation in Africa. These examples are designed to be specific and actionable.

Land use planning and zoning:

- Urban development zones shall be delineated in municipal development plans, clearly demarcating areas for residential, commercial, industrial, and agricultural use. The conversion of prime agricultural land for non-agricultural

purposes within designated agricultural zones is prohibited without explicit authorisation from the Ministry of Agriculture.
- Local authorities shall establish mandatory greenbelts around urban centres, with a minimum width of [specified meters], to prevent urban sprawl and preserve natural ecosystems. These greenbelts shall be protected from development and maintained as public green spaces.

Environmental Impact Assessments (EIAs):
- All urban development projects exceeding [specified area] or involving [specified activities] shall require a mandatory Environmental Impact Assessment (EIA) conducted by a certified environmental consulting firm. The EIA shall assess the project's potential impacts on soil, land, water resources, and biodiversity.
- EIAs shall include a specific 'soil impact assessment' including a detailed soil management plan, outlining measures to prevent soil erosion, maintain soil fertility, and minimise land disturbance during construction and operation. The soil management plan shall be subject to public review and approval by the environmental regulatory authority.

Soil and land conservation laws:
- Mining and quarrying activities shall be subject to strict rehabilitation requirements, including restoring excavated areas to their original topography and revegetating disturbed lands with native plant species. A rehabilitation bond shall be required to ensure compliance.
- Farmers and landowners shall implement soil conservation practices, such as contour ploughing, terracing, and cover cropping, in areas prone to soil erosion. The Ministry of Agriculture shall provide technical assistance and financial incentives to support these practices.

Waste management regulations:
- Municipalities shall establish integrated waste management systems, including separate collection of recyclable materials, composting organic waste, and safe disposal of hazardous waste. Landfilling of untreated municipal solid waste is prohibited.
- Industrial facilities shall be required to treat wastewater to meet specified discharge standards before releasing it into the environment. Monitoring and reporting wastewater discharge shall be mandatory and subject to regular inspections by environmental authorities.

Water resources management laws:

- Water abstraction permits shall be required for all large-scale water users, including industries, agricultural operations, and urban water supply systems. Water allocation shall prioritise essential human needs and environmental flows.
- Urban stormwater runoff shall be managed through the implementation of green infrastructure, such as rain gardens, permeable pavements, and constructed wetlands, to minimise soil erosion and water pollution.

Urban agriculture regulations:

- Municipalities shall designate areas for urban agriculture, including community gardens, rooftop gardens, and vertical farms. Access to land and resources shall be provided to urban farmers, especially marginalised communities.
- Urban agriculture practices shall comply with sustainable agriculture standards, including organic fertilisers, integrated pest management, and water-efficient irrigation techniques.

Enforcement and compliance mechanisms:

- Environmental regulatory authorities shall conduct regular inspections of development projects, industrial facilities, and agricultural operations to ensure compliance with environmental laws. Penalties for violations shall be proportional to the severity of the offence and shall include fines, remediation orders, and project suspension.
- A public environmental complaints mechanism shall be established to report violations of environmental laws. Whistleblowers shall be protected from retaliation.

Community participation and empowerment:

- Local communities shall be involved in developing and implementing land use plans and environmental management strategies. Public hearings and consultations shall be conducted to gather community input.
- Community-based environmental monitoring programs shall be established to track soil and land degradation and assess the effectiveness of environmental policies.

Regional and international cooperation:

- The government shall participate in regional environmental agreements and initiatives to address transboundary environmental issues, such as desertification and water resource management.

- The government shall seek technical and financial assistance from international organisations to support the implementation of sustainable land management practices and environmental protection measures.

Climate change, urbanisation, and infrastructure

Climate-resilient infrastructure planning:

- All new urban infrastructure projects (roads, bridges, water systems, energy grids) shall undergo a Climate Resilience Assessment, evaluating potential climate change impacts (flooding, heatwaves, sea-level rise) over the project's lifespan and incorporating adaptation measures.
- National and municipal infrastructure development plans shall integrate climate change projections and risk assessments, prioritising investments in resilient infrastructure that can withstand future climate impacts.
- Infrastructure projects located in coastal areas must include a sea level rise impact study and take into account the projections of sea level rise for the next 100 years.

Urban planning and development controls:

- Urban planning regulations shall incorporate climate change adaptation measures, including:
  - Designating flood-prone areas as green spaces or permeable zones.
  - Mandating the use of heat-resistant building materials and designs.
  - Promoting the development of green infrastructure (parks, green roofs, urban forests) to mitigate the urban heat island effect.
- Municipalities shall develop and enforce zoning regulations that restrict development in areas vulnerable to climate hazards (floodplains, coastal zones, areas prone to landslides).

16. Commentary XV: Tenure rights

Land refers to parts of the earth that support agriculture, provide habitats, and harbour natural resources. This definition of land encompasses the physical land and all objects thereon, including the soil and subsoil, water bodies and their associated living organisms, as well as the air and atmosphere above. From a socio-cultural perspective, land is a religious and ancestral resource of significant value, serving as sacred sites and burial grounds for generations, thereby forming part of the cultural heritage. As a source of socio-cultural well-being for a people, land constitutes a vital spiritual link and the primary means of communication between them, the dead/ancestors, and their god. As an ancestral gift, land before colonisation was held in trust by members of

customary communities to protect and pass on to future generations, which is why it could not be alienated through sales, as this would have depleted the family or community patrimony. Furthermore, from a socio-economic perspective, land provides for basic sustenance. Again, land is utilised from both economic and political perspectives for wealth creation and as a means of power and control. In contemporary times, land constitutes a form of capital that generates wealth or is used to create more wealth due to the economic value it commands.

Land tenure has been defined as "the terms under which individuals, households or social groups hold land and natural resources."[55] Land tenure is a crucial aspect of landholding and a key consideration in any discussion regarding the sustainable management of land and soils. Land governance in Africa has become a central concern in recent decades. One of the concerns is land tenure security, which refers to how secure individuals feel about 'their rights' to land, how such land rights are recognised by law, and safeguarded by competent state authorities. Concerns about land tenure security are triggered by the continuous surge in the market value of land, as it has increasingly become an economic commodity, and a corresponding increase in demand for this versatile resource. Land tenure security concerns are also provoked by urban expansion, as well as by the social and political dimensions and the agro-ecological functions of land as an invaluable asset. The impacts of all these land interests have triggered a call for sustainable land management (SLM), succinctly captured by the concept of 'Land Degradation Neutrality' (LDN), which was adopted as part of the 2030 Agenda for Sustainable Development in 2015. Introduced by the United Nations Convention to Combat Desertification (UNCCD),[56] LDN aims to achieve a state in which the amount and quality of land resources remain stable or increase, preventing the net loss of healthy and productive land.

Land tenure systems and their degree of security have implications for sustainable or unsustainable land management, which must be understood within specific socio-economic and legal contexts.[57] Land tenure systems can guarantee tenure security and work favourably for SLM.[58] Evidence is unequivocal that secure land tenure is an indispensable precondition for sustainable land and soil management. Despite substantial evidence linking land tenure security to SLM, the governance frameworks necessary to guarantee such security remain generally weak across many African countries. At the core of land tenure security is the recognition and protection of land rights, namely, the rights to access, use, and ownership, which constitute a fundamental prerequisite and key determinant of effective land and soil stewardship. However, tenure security in Africa is undermined by a host of structural, legal, and institutional

55 IPCC (2019: 749).

56 The United Nations Convention to Combat Desertification (UNCCD) is the driving force behind LDN, serving as the sole legally binding international agreement linking environment and development to sustainable land management.

57 See IPCC (2019: 70).

58 Ibid.

challenges that significantly hinder the sustainable management of land and soil resources. Land tenure governance across Africa is premised on a shared historical legacy of colonialism/foreign administration, inequality, tenure diversity, and fragmentation.[59] The persistence of tenure insecurity, decades after African countries' independence and despite ongoing land tenure reforms, raises questions about the genuineness and effectiveness of these reforms. Without effective land governance systems that guarantee tenure security, it will be challenging to manage land sustainably. Security of tenure is a decisive factor for sustainable land management and, consequently, crucial for soil protection.

This Commentary examines land tenure systems in Africa, identifies structural challenges to tenure security, and proposes legal and institutional mechanisms to strengthen equitable land governance and support sustainable land and soil management.

16.1. Description of the challenges of land tenure security that are drawbacks for sustainable land/soil management in Africa

According to the IPCC report,[60] unclear land tenure rights breed tenure insecurity and undermine incentives to manage land and soil sustainably. Land tenure insecurity is a serious constraint to the sustainable management of land and soils in Africa. Despite decades of land tenure reforms across Africa, challenges persist in establishing optimal land tenure arrangements that can ensure the achievement of the expected goals, including providing security for all and, above all, sustainability. Sustainability in this regard refers to the consequential environmental and social benefits of secure land tenure, such as reducing pollution, preventing land and biodiversity degradation, mitigating climate change, enhancing productivity, ensuring food security, and alleviating poverty. The challenges, some of which vary across the different countries and regions of Africa, are many and range from:

16.1.1. Duality of land tenure – statutory/formal and customary

There are two primary forms of land tenure systems in Africa: statutory/formal land tenure, which is based on written rules, and customary land tenure, which is based on unwritten rules, norms, and practices. Until the colonial period, the customary land tenure system dominated land management in the various pre-state communities. The duality of land tenure is a significant challenge that does not bode well for SLM. There

59 Bayer (2021: 47).
60 See Nabuurs et al. (2022: 825).

is a disparity between statutory/formal land tenure and customary land tenure systems. Formal/statutory land titles, which are generally considered superior to customary land tenure in most African countries, are associated with higher perceptions of tenure security than customary land tenure.

The most important feature of the customary land tenure system is that an individual's or family's, or group's rights to hold land in a specific community are based on membership in the socio-political community, ethnic group, clan, or family with the land in common trust.[61] Under this system, land has been acquired, possessed, and transferred within community regimes based on norms derived from longstanding practices commonly established by the village, clan, or tribal community.[62] Recognising that customary land tenure systems are not uniform across Africa can be beneficial. They are diverse and vary significantly across countries, states, and regions, reflecting the unique histories, cultures, and socio-political structures of different communities.

Another key feature of customary land tenure in Africa is that land rights are usually earned through 'son of the soil' entitlements.[63] However, it is common for both strangers and 'sons of the soil' to pay for such land rights.[64] Even though such land may still be collectively owned, individuals can claim rights to use a specified piece of land through long-term occupation and possession. In many communities, this right of use is transferable to other family members and those who can pay. Generally, customary tenure systems often prohibit land sales, especially to non-group members, to maintain community control and ownership. Until the neo-liberal reforms, outright sales of such lands were uncommon, although informal sales were common.

Additionally, customary land tenure systems have remained essentially unchanged, having been influenced by colonial and post-independence government interventions, and continue to adapt to social, economic, political, and cultural shifts. Customary tenure in contemporary times ranges from what is known as 'permissive occupancy' of state lands in some countries, such as Zimbabwe, to formalised customary tenure regimes that allow the registration of collective and individual titles in countries such as Burkina Faso, Uganda, Rwanda, and Tanzania.[65] In African countries, customary lands can be under the authority of traditional leaders or the control of large clans or families.

The conflict between statutory land tenure and customary land tenure often culminates in the loss of land rights for the poorest and marginalised. This has implications for unsustainable land-use practices and negative consequences for land and soil degradation, as they may use unsustainable methods to establish rights and

61 Chigbu et al. (2022: 664).
62 Ibid.
63 Chimhowu (2019: 898).
64 Ibid.
65 Wily (2011: 458).

claims to land. There is growing recognition that modern land laws must build on customary land tenure norms and practices. Some African countries have adopted legislation that protects customary land tenure rights.[66]

16.1.2. Costly and complex/cumbersome procedures for establishing formal land titles under statutory law

The procedures for acquiring formal land titles under statutory law in many African countries are often costly, complex, and bureaucratically burdensome, disproportionately favouring wealthy, well-connected individuals over marginalised populations and those with limited means. While legal frameworks may formally guarantee every person—natural or legal—the right to own, use, enjoy, and dispose of land, these rights are, in practice, inaccessible to the average citizen.[67] The requirements for securing land titles are frequently beyond the financial and logistical reach of ordinary people. As a result, land ownership tends to concentrate in the hands of the state, large corporations, religious institutions, national elites, and affluent individuals, particularly as land becomes increasingly scarce due to declining fertility and rising economic value.[68] Furthermore, land titling processes are often characterised by inefficiency, opacity, and corruption. In addition to being slow and expensive, the procedures may be marred by unfair dealings, such as double land sales and administrative or judicial decisions that cancel land titles, often to the advantage of influential actors. Consequently, even those who manage to secure land titles may still face insecurity. This pervasive uncertainty discourages long-term investments in land. It fosters unsustainable land-use practices, as occupiers may avoid conservation efforts or exploit soil resources unsustainably out of fear of eviction or dispossession. Ultimately, such systemic challenges undermine both equitable access to land and adequate soil protection across the continent.

16.1.3. "Land-grabbing" and dispossession of local communities

Another significant challenge to land tenure security in Africa is land grabbing—the large-scale acquisition or leasing of land, often involving the dispossession of local communities and future generations from community and family lands. State authorities frequently facilitate these large-scale land acquisitions (LSLAs) in

66 Cotula (2007).

67 In legal terms, a natural person or (physical person) is a human being. In contrast, a moral person (or legal person) is an entity, such as a corporation or organisation, granted legal rights and responsibilities.

68 Cameroon's Country Report by Tamasang in Ruppel et al. (2025: 29, 32, 75).

collusion with powerful actors, including foreign investors, natural resource and agribusiness companies, and domestic elites. Land grabbing is particularly prevalent in Africa, where vast tracts of land are being secured for commercial agriculture, mining, and infrastructure development. LSLAs are a threat to tenure security and SLM, but the nature and scale of the threat are not well understood.[69] Based on cross-checked data for completed lease agreements in Ethiopia, Ghana, and Tanzania, LSLAs cover 1.9%, 1.9%, and 1.1% of each country's total arable land.[70] The literature presents differing views on whether these acquisitions involve marginal lands or already utilised lands, potentially displacing existing users.[71]

Although one of the cited justifications for LSLAs is that they can boost food production on a larger scale, they also contribute to land tenure insecurity, enabling unsustainable land-use practices by land grabbers and resulting in negative consequences such as land and soil degradation.

16.1.4. Traditional leaders

A twin challenge accompanying LSLAs and the dispossession of local communities is the corruption and co-optation of traditional leaders by state authorities. This often occurs through promises of political favour, material benefits, or enhanced status. In many instances, traditional authorities are pressured or incentivised to endorse land deals that undermine the rights and livelihoods of their communities. This issue is particularly acute in peri-urban areas, where land is highly sought after for urban expansion and commercial development.

Collusion between traditional authorities and formal land administration services has been widely condemned, including during national debates held as part of the Convention on Land in Guinea.[72] Such practices not only compromise community trust and traditional governance structures but also exacerbate tenure insecurity and fuel land conflicts. They highlight the urgent need for stronger legal safeguards, transparent land governance, and mechanisms for genuine community consultation and consent in land transactions.

69 IPCC (2019: 70).
70 Ibid.: 750.
71 Ibid.
72 Gret (2024).

16.1.5. Wanting inclusive land governance across Africa, giving rise to corruption and land disputes

Inclusive land governance, defined as the meaningful participation of all stakeholders with an interest in land, is generally lacking in many African countries.[73] Yet such participation is vital to upholding the rule of law and ensuring the long-term sustainability of land and soil management. In practice, applicants for land titles often fail to engage with or consult individuals and communities with legitimate interests in the land. In the absence of inclusive consultation, some applicants resort to corrupt practices, such as bribing local stakeholders or government officials involved in the land titling process. These actions undermine transparency and accountability, frequently giving rise to land disputes that destabilise tenure arrangements and obstruct efforts toward sustainable land use and soil protection.

16.1.6. Gender discrimination regarding access to land, use, and ownership across Africa

Land tenure security is a key enabler of women's empowerment and a critical factor in achieving sustainable land and soil management, particularly for women, who make up a large proportion of smallholder farmers in Africa. While many African countries have made progress in adopting legislation that promotes gender equality in land access, use, and ownership, women's rights to land remain constrained in practice. Discriminatory customary norms, combined with weak enforcement of legal provisions, continue to limit women's ability to inherit, acquire, or retain land. In many communities, customary systems often exclude women from land inheritance, which remains a primary means of acquiring land. As a result, women are frequently confined to smaller, fragmented plots, which reduces their capacity to invest in and implement sustainable land and soil management practices.

16.1.7. Inadequate recognition of customary land tenure rights and the eminence of the state as the primary steward of all lands across Africa

Local communities and indigenous peoples in Africa often lack formal recognition of their land tenure rights. The IPCC's Fifth Assessment Report identifies the non-recognition of customary tenure, loss of possession rights, and insecure tenure as key socio-economic risks of implementing climate change mitigation strategies in the

73 Bayer (2021: 47).

Agriculture, Forestry, and Other Land Use (AFOLU) sector.[74] These risks apply equally to efforts aimed at promoting sustainable land management (SLM). Where customary land systems are unrecognised, undermined, or unenforced by the state, tenure insecurity is likely to result. Across Africa, states frequently assert sovereign stewardship over land, designating vast areas as national or state lands. This legal framing enables governments to reallocate customary lands, often without adequate consultation or compensation, for large-scale agricultural or mining investments. Such practices marginalise vulnerable communities, undermining their trust in state institutions and increasing the likelihood of conflict, land degradation, and unsustainable land use as acts of resistance to dispossession.[75]

16.1.8. Diversity of land tenure systems in Africa

African countries exhibit a range of land tenure systems, including customary tenure, formal or statutory tenure, and hybrid systems, with varying degrees of individual, communal, and state control. Pre-colonial practices, colonial legacies, and post-independence policies often influence these systems. Regarding the factors that affect land tenure diversity, pre-colonial tenure systems were established by pre-state communities. Regarding colonial legacies, colonial governments typically introduced formal land tenure systems that replaced or superseded customary practices. Regarding post-independence policies, governments have implemented various land policies, some aimed at promoting private land ownership, while others focused on protecting customary land rights. In modern times, population growth, urbanisation, investments, and economic development have put pressure on land resources, leading to changes in land tenure systems. All of these, in one way or another, contribute to conflicts and tenure insecurity. A discussion of land tenure security in the context of sustainable land and soil management in Africa must consider the implications of informal/customary and modified customary land tenure systems.[76] A significant percentage of Africa's total land area is managed under some form of these customary or communal tenure systems, and only a small fraction is formally recognised by the governments of a few countries. Customary land rights span various categories of land but are difficult to assess accurately due to a lack of legal recognition, inadequate reporting, and limited access to reporting systems.[77] It is reported that in 2005, only 1% of the land in Africa was legally registered.[78]

74 Smith et al. (2014: 853).
75 Mazwi & Mudimu (2021: 225).
76 IPCC (2019: 749).
77 Ibid.
78 Ibid.

16.1.8.1. Customary land tenure systems

Customary land tenure systems are based on traditional norms, rules, and practices that have evolved within specific communities. The characteristics are as follows:

- Land is often seen as a communal resource, with access and use rights determined by kinship, lineage, and community membership.
- Rights are often tied to specific social roles and responsibilities within the community.
- Land is typically not considered a commodity to be bought and sold, but rather as a source of livelihood and social identity.

Thus, in communal land tenure systems, land is held collectively by a community, and community needs and decisions determine access. Individuals may have the right to use land for specific purposes, such as farming or grazing, but not necessarily the right to own it. In some communities, only male children can inherit land, while in other communities, land is inherited by both males and females. In patrilineal systems, land ownership and inheritance are handed down through the male line.

16.1.8.2. Formal or statutory land tenure systems

On the other hand, formal or statutory land tenure systems are based on laws and regulations established by national governments, which recognise and protect land ownership and use rights. Formal or statutory land tenure systems exhibit the following characteristics:

- Land can be owned privately, communally, or by the state.
- Land ownership and use rights are registered and documented.
- Land can be bought, sold, and used as collateral for loans.

Regarding private land ownership, natural persons, individuals, and corporations have the right to own and manage land.

Regarding state land ownership, governments own and control land and may lease or allocate it to individuals or organisations. In some countries, such as Cameroon, a distinction is made between state and private land. It includes lands belonging to public bodies and state-controlled national lands, which the state can classify or incorporate for environmental or developmental purposes. It can also be allocated to corporations through investment leases. Thus, individuals or organisations can lease land from the government or other landowners for a specific period.

16.1.8.3. Hybrid and informal systems

Many African countries have formal and informal land tenure systems, with customary tenure systems often coexisting with formal or statutory systems. In some countries, customary tenure systems are not formally recognised and frequently operate outside formal legal frameworks, with land rights determined by customary norms and practices. Such informal systems can be vulnerable to conflict and insecurity, as they are not always legally recognised or protected. Clashes and disputes can arise between customary and formal land tenure systems.

16.2. Issuance of more than one title over the same piece of land

In many cases, multiple land titles are issued over the same parcel of land, resulting in disputes and tenure insecurity. This problem is often rooted in poor land administration, including inadequate record-keeping, weak institutional capacity, and corruption within land governance systems. Such uncertainty is deeply frustrating for landholders and may discourage long-term investment in sustainable land use. Instead, it can incentivise exploitative or short-term land management practices, ultimately harming soil health and undermining SLM. The cumulative effect of these challenges underscores the urgent need for comprehensive land tenure reform across Africa. Robust, transparent, and accountable tenure systems are crucial for securing land rights, mitigating conflict, and promoting responsible stewardship of soil resources.

16.3. Options or mechanisms that can safeguard land tenure security in Africa

Understanding the interactions between land tenure security and SLM in Africa must be grounded in the relationship between land tenure systems and soil security. Tenure security is a decisive factor for SLM and soil protection.[79] Strengthening land tenure security can facilitate the adoption of soil conservation measures, thereby contributing to SLM.[80] Land tenure security can be safeguarded or achieved through various legal and non-legal mechanisms if land tenure rights are clearly defined and well-established.

79 IPCC (2019: 749).
80 Ibid.: 287.

16.3.1. Main focus: Legal mechanisms that safeguard land tenure security to be considered in accordance with each country's specificity in Africa

To strengthen SLM, African countries should adopt legal mechanisms that protect tenure security and stability. These mechanisms may include the provision of formal land titles, long-term leases, and the formal or legal recognition of customary land tenure systems, preferably enshrined in national constitutions. Importantly, such measures should reflect the diverse tenure systems that exist across the continent. However, while these approaches hold promise, existing research indicates only medium confidence that land titling and the recognition and respect of indigenous and communal tenure systems consistently result in improved SLM outcomes. The effectiveness of these legal interventions often depends on broader governance factors, including implementation capacity, institutional integrity, and the degree of community participation in land governance processes.[81]

16.3.2. Legal option one: Formal title or freehold land tenure

Formal title or freehold land tenure is a traditionally Western concept of individual property rights that envisages absolute land rights, implying the right to own, control, manage, use, and dispose of land. While such land rights are held in perpetuity, the state may expropriate the land when it is targeted for public purposes (for example, road construction, urban expansion, etc.). Formal title is the most secure form of land tenure in Africa.[82] During this tenure, landowners often invest in sustainable land and soil management practices.

16.3.3. Legal option two: Long-term lease under leasehold land tenure

A lease is a contract by which one party, known as the lessor, conveys land, property, services, etc., to another, known as the lessee, for a specified time. Under a leasehold, land tenure rights are based on the notion of renting for a specified period. Such leases can be long or short. A long-term lease, typically involving a 99-year lease, is considered a highly secure form of land tenure. Under this mechanism, land belonging to one entity, either the state or an individual (the lessor), is, by contractual arrangement, leased to another entity or person (the lessee). The lease agreement is then registered against the title of that land to create effective and enforceable land rights. Leasehold land tenure has been primarily associated with large-scale farming

81 Ibid.: 70.
82 Kasimbazi (2017: 9).

and elite land ownership regimes.[83] In some jurisdictions, such as Uganda, non-citizens are only eligible for leases.[84] Under short-term leases, land usually suffers greater degradation, as tenant farmers may be unwilling to undertake sustainable land management or soil protection measures because they do not have the land long enough to realise the benefits of their investments. On the contrary, long-term leases support sustainable land and soil management, as leaseholders feel more secure and tend to improve the land, just as title owners do.

16.3.4. Legal option three: Formal recognition of customary land tenure, especially in constitutions

Under customary land tenure, land is administered according to the customs of local and indigenous communities, rather than under statutory tenure or a formal title system. Under customary land tenure, land ownership is vested in a tribe, group, family, or community and allocated by customary authorities or traditional leaders. Customary land rights are often flexible and overlapping, allowing individuals and groups to use local lands and their appurtenant resources. Access to land is typically restricted by kinship or ethnicity, excluding outsiders and restricting land sales. Individuals or families within a community may be allocated land for their individual or family use. Still, if they leave the land unused, it may return to the community. This is the most common type of tenure in Africa. For example, approximately 70% of Kenya's land tenure is customary.[85]

Customary land tenure systems in Africa are increasingly vulnerable to the misuse of state power, particularly under the pretext of eminent domain, which has often facilitated state-led encroachment onto customary lands. In practice, this has disproportionately affected people experiencing poverty, who are typically unable to afford formal land registration, resulting in a lack of secure tenure. Scholars and policy assessments have observed that customary tenure arrangements often provide only weak legal protection, especially in contexts where state law does not formally recognise or enforce such rights.[86] However, where tenure security is ensured for customary landholders and communities, it tends to promote the retention of traditional knowledge and practices, many of which support SLM and soil protection. Strengthening the legal recognition of customary tenure can thus serve not only to safeguard livelihoods but also to reinforce ecologically sound land stewardship.

83 Ibid.
84 Ibid.
85 Ibid.
86 Lang (2017: 116).

16.4. Additional focus: Non-legal mechanisms to be mentioned or considered as supplementary tools for safeguarding land tenure security by countries/regions in Africa

Some incentive mechanisms (non-legal tools that can safeguard land tenure security) that can encourage farmers to invest in degraded lands and own them to avoid continuous pressure on already scarce fertile lands include:

- providing them with manure free of charge; and
- granting interest-free loans.

16.5. Annotations: explanation of the different options for safeguarding land tenure security in Africa (pros and cons for each option/system)

The significant socio-political and legal changes for SLM require a wide range of land governance mechanisms.

16.5.1. Explanation of formal title as an option for safeguarding land tenure security in Africa

Formal land title under statutory law is widely recommended as one of the most robust mechanisms for safeguarding land tenure security in Africa. Once established, such a title is typically deemed absolute, definite, and difficult to challenge. Even in cases where it is contested, formal institutions often possess the legal and administrative strength to adjudicate and enforce rights effectively. Accordingly, a formal title offers landowners and users the highest degree of tenure security, which can incentivise the adoption of SLM practices.

However, despite these advantages, the statutory land titling system can also generate significant exclusion. Access to a formal title is often contingent on an individual's ability to navigate complex, costly, and bureaucratic procedures—conditions that tend to favour elites and marginalise people with low incomes. As a result, this model of land tenure recognition can entrench inequality and undermine broad-based access to land. In contrast, customary land tenure systems are typically grounded in communal norms and collective responsibility, prioritising inclusion and social welfare over exclusivity. These systems enable community members to access and use land in ways that support familial livelihoods and social cohesion. Therefore, while formal titling provides legal certainty, it may simultaneously undermine the inclusive principles embedded in customary land governance, with implications for equity and sustainability.

16.5.2. Explanation of long-term lease

Long-term leases, typically extending up to 99 years, are widely regarded as a highly secure form of land tenure. Lessees under such arrangements often enjoy a level of tenure security comparable to that of formal titleholders. This sense of stability incentivises long-term planning, investment, and land stewardship, thereby promoting SLM. In contrast, short-term lease arrangements tend to offer little security or incentive for tenants to invest in land improvement or conservation. Short-term tenants may avoid implementing SLM practices, as the limited duration of their lease does not allow sufficient time to realise the benefits of such investments. Thus, lands under short-term leases are often more vulnerable to degradation and unsustainable exploitation. In this regard, long-term leases not only support tenure security but also enable environmentally sound land-use practices by allowing lessees adequate time to recoup costs and enjoy the benefits of their stewardship.

Long-term lease as an option for safeguarding land tenure security in Africa offers several opportunities for sustainable land/soil management, including:

- Encouraging investment in land and soil improvement as it provides land users, such as farmers, the security and stability to invest in their land, leading to improved soil health and overall productivity.
- Offering stability and predictability and promoting sustainable practices, enabling investors to plan and invest in long-term projects, and to adopt sustainable land management practices, reduce fertiliser use, as they can see the long-term benefits of the sustainable land management practices, especially regarding soil protection.
- Enabling diversified land management systems by supporting agroforestry is essential for improving soil health and reducing erosion and pollution.
- In some cases, long-term leases are inheritable, further increasing the security of tenure and encouraging long-term investment, crucial for soil sustainability.

16.5.3. Explanation of formal or legal recognition of customary land tenure

One of the key shortcomings of customary land tenure systems, highlighting the need for formal or legal recognition, is their vulnerability to abuse of power. These abuses often occur under the guise of state ownership or through interference by foreign investors and traditional leaders who exceed or misuse their authority. This has facilitated widespread encroachment on customary lands, often with little to no compensation for the affected communities. Despite such vulnerabilities, customary tenure remains a foundational element of land law in virtually all African countries.[87]

87 McAuslan (2006).

Another significant limitation is that customary tenure does not provide the same level of security as private land titles. Its lack of formal recognition and its operation outside statutory frameworks often leave communities exposed to tenure insecurity and legal marginalisation. To address this, customary land rights should be legally recognised, ideally through constitutional provisions that guarantee rights of ownership, access, and use, rather than merely confining customary claims to occupation and use of "national land" owned and controlled by the state.[88] The importance of securing customary tenure is further underscored by empirical evidence from the Intergovernmental Panel on Climate Change (IPCC), which finds a strong correlation between secure communal tenure and lower deforestation rates. Forest preservation, in turn, helps prevent soil erosion and maintain soil fertility, thereby enhancing conditions for SLM.[89] Legal recognition of indigenous and customary land rights through targeted reforms is, therefore, not only a matter of equity and justice but also a cost-effective and contextually appropriate strategy for improving soil protection and land governance across Africa.[90]

Another critical shortcoming of the customary land tenure system that necessitates formal recognition is the security risk posed by competing claims from multiple rights holders, especially in areas subject to diverse uses such as agriculture, grazing, and fishing. These challenges are particularly acute in regions facing socio-political and climatic instability, such as the Sahel, where climate-induced stressors contribute to conflict between farmers, pastoralists, and fisherfolk, all competing for limited fertile land and water resources.

Customary institutions, though culturally embedded and historically resilient, often lack the regulatory capacity to manage such complex and overlapping claims effectively. The absence of formal mechanisms to recognise and adjudicate these rights exacerbates insecurity, especially where rights are informal and undocumented.

To address this, a customary land registration system, administered at the local level, has been proposed. Such a system would allow community members to register their lands under customary tenure, offering an accessible and cost-effective alternative to formal titling in rural areas. However, communities often express deep scepticism toward local administrations, fearing corruption, lack of transparency, and elite capture. From the perspective of grassroots communities, entrusting local governments with land management responsibilities can alienate them from decision-making processes and expose them to power imbalances, particularly when local officials allocate land to politically connected elites without proper consultation.

To overcome these challenges, any customary registration scheme must be grounded in participatory governance and incorporate robust safeguards. This could be achieved by establishing land commissions composed of trusted community

88 Wily (2011: 24).
89 IPCC (2019: 749).
90 Ibid.

figures, such as elders, kinship heads, and clan leaders, to authenticate and supervise land claims. National legislation could provide that, while formal titles may be issued in rural areas, customary land rights documented through certificates of customary ownership should be equally recognised and provide adequate tenure security. This approach allows both systems to coexist and complement one another, reflecting the socio-legal pluralism present in most African contexts.

The constitutional recognition of customary tenure is crucial. While many African states have acknowledged the legal and/or legitimate status of various land tenure systems, tenure security remains narrowly tied to statutory titles, such as individual land titles and leases. This reality excludes many who customarily hold land but lack the resources to navigate costly and complex formal titling processes. Legal reform that establishes a dual tenure system comprising statutory and customary tenure offers a path forward for enhancing tenure security and promoting SLM.

A further justification for such reform is the potential for greater local and indigenous buy-in, where legal recognition of customary systems fosters legitimacy, trust, and stewardship over land. The alignment of formal legal systems with community norms can help translate tenure security into sustainable land-use practices, with positive spillover effects for soil conservation, biodiversity, and climate resilience.

While a dual system is normatively sound and socially responsive, its practical implementation is contingent upon political will. Where feasible, it would involve land titling under statutory law in urban, peri-urban, and certain rural areas, as well as customary land registration in rural areas, through less burdensome and more inclusive procedures. Such an approach would ensure that legal pluralism is not merely tolerated but institutionalised, forming the bedrock of a more equitable and sustainable land governance regime in Africa.

16.5.4. Other options/mechanisms in response to the challenges of land tenure security

Other ways of carrying out land tenure reform to appropriately safeguard tenure security across Africa, to enhance sustainable management of land and soils on the continent are:

- Formulation of comprehensive national land management legislation/acts, or policies.
- Establishment of national land tenure agencies that supervise all transactions relating to acquiring formal land titles, leases, and registration of customary lands in respective countries.
- Guarantee fairness and certainty in granting land titles with secured access, ownership, and use rights. Tenure security is essential for adopting sustainable

land management practices. This is especially true in an era characterised by payment for ecosystem services, in which landowners are encouraged to restore and rehabilitate degraded land, cultivate and store carbon, and receive payment for that carbon through the Crediting Mechanism.

- Implement land tenure reforms that ensure the participation or involvement of those interested in land that is the subject of any transaction to overcome the lack of inclusive land governance across Africa.
- Implement land tenure regimes that recognise and uphold the co-existence of both statutory and customary tenure systems. Secure land tenure, especially for communally managed lands, helps reduce large-scale and arbitrary land appropriations.[91]
- Simplify the complex/cumbersome procedures for establishing formal land titles and institute less complex/cumbersome and less costly methods for registering customary lands.
- Institute strict measures to guard against land-grabbing and corruption of traditional leaders and ensure adequate compensation to those whose lands are expropriated for public interest. If the public-interest goal is not attained, such land should revert to its owners. To overcome LSLAs, governments can implement policies that impose restrictions on the size of land sales/leases; reinforce pressure on agribusiness companies to agree to Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, or similar principles; strengthen existing land law and land registration systems; in partnership with NGOs, make use of community monitoring systems and enhance protests against LSLAs.[92]
- Secure land rights, including for customarily held lands, can incentivise users to adopt long-term SLM practices that benefit soil protection.
- Encouraging traditional rulers to abolish customs and practices that discriminate against women, especially those that prohibit women from inheriting land. Empowering women can bolster SLM, a goal achieved through policy instruments that account for gender differences.[93] The overwhelming presence of women in many land-based activities, including agriculture, provides opportunities to mainstream gender policies, overcome gender barriers, enhance gender equality, and increase SLM.[94]
- Enhance and digitalise record-keeping to stamp out corruption and issuing more than one land title over the same parcel of land.
- Above all, the IPCC recommends more research on the optimal tenure mix, including low-cost land certification, redistribution reforms, market-assisted

91 IPCC (2019: 287).
92 Ibid.: 750.
93 Ibid.: 70.
94 Ibid.

reforms, gender-responsive reforms, and collective forms of land tenure such as communal and cooperative land tenure.[95]

16.6. Proposed text for legal provisions for safeguarding land tenure security in Africa

(1) The law guarantees every citizen the right to own, use, control, and dispose of land. However, the enjoyment of these rights is conditioned on proof of a land title/certificate or a certificate of customary ownership in the case of customary land, duly established in accordance with laid down rules and procedures.
(2) Natural persons and corporate bodies of foreign nationality or corporations wishing to invest in a country may conclude lease agreements to have access to land. Such a lease may be granted over urban or rural lands. Deeds drawn up for this purpose shall bear the prior approval of the minister in charge of lands, under penalty of being null and void.
(3) Owners of both long-term and short-term leases shall invest in land improvement, foster long-term land planning, and promote efficient resource use.
(4) The Constitution or this law hereby recognises the co-existence of both statutory land tenure systems, consisting of the issuance of private land titles, and customary land tenure systems, consisting of the issuance of a certificate of customary ownership.
(5) Occupants of lands in rural and peri-urban areas who cannot afford to register such lands under formal land titling systems may apply for such lands to be registered and a certificate of customary ownership issued under the customary land tenure system.
(6) This law establishes a national land tenure agency that is in charge of supervising all transactions relating to the acquisition of formal land titles, leases, and registration of customary lands in the country.

17. Commentary XVI: Traditional leaders

This Commentary advocates for sustainable soil governance that recognises the vital role of traditional leadership in Africa as custodians of local customs and the land. It further promotes inclusive governance by encouraging the integration of traditional knowledge systems with modern scientific approaches.

95 Ibid.: 287.

Soil is a fundamental natural resource, composed of minerals, organic matter, gases, liquids, and a vast array of organisms that together sustain life on Earth. Its formation is a gradual process that occurs over thousands of years through the weathering of rocks and the decomposition of organic materials. Soil plays an indispensable role in supporting terrestrial ecosystems by providing physical stability and essential nutrients for plant growth, serving as a habitat for countless organisms crucial to biodiversity and ecological balance, and acting as a natural carbon sink that contributes to climate change mitigation.

Despite its critical importance, soil is increasingly under threat due to population pressures, rapid industrialisation, and climate change. These forces drive soil degradation through erosion, nutrient loss, and contamination, which in turn accelerate desertification and diminish the land's capacity to sustain life. In response, there is an urgent need for all relevant stakeholders to engage actively in the sustainable management of soil resources. Among these, traditional leaders hold a unique position. As stewards of customary land and repositories of indigenous knowledge, they are indispensable actors in efforts to protect and restore Africa's soils.

17.1. Soil governance

Soil governance encompasses the policies, institutions, and processes that direct the management, conservation, and sustainable use of soil resources. It plays a critical role in ensuring food security, preserving biodiversity[96], mitigating climate change, and sustaining vital ecosystem services.

Soil governance has the following components: policy framework, institutional structures, regulatory mechanisms, stakeholder engagement, capacity building, research, and monitoring.

Well-governed soil exhibits several characteristics that contribute to its health, productivity, and sustainability, thus supporting sustainable agriculture and food security.

17.1.1. Key stakeholders in soil governance in Africa

Soil governance in Africa involves a diverse range of stakeholders who play critical roles in managing and sustainably using soil resources. These include national and regional governments, which are responsible for developing and enforcing policies and regulations; farmers and agricultural communities, who are the primary stewards of the land; and research institutions that provide essential data and technical support.

96 See Hinz & Ruppel (2008); Hinz et al. (2012).

Non-governmental organisations and environmental groups contribute to soil health through advocacy, awareness-raising, and community initiatives. At the same time, the private sector, including agribusiness and mining companies, has a significant impact on soil health through their operations. International organisations and development partners support policy development, funding, and regional collaboration. Indigenous communities and traditional leaders offer invaluable local knowledge, and policymakers and urban planners influence long-term land-use patterns. Despite the broad range of actors involved, soil governance in Africa faces significant challenges, including widespread land degradation and erosion, fragmented land tenure systems, high population pressure, weak policy frameworks, socio-economic inequalities, and competing land uses such as mining and urban development. These challenges require inclusive, well-coordinated, and context-specific strategies that integrate traditional knowledge with modern science to ensure effective and sustainable soil management across the continent.

17.1.2. Traditional leaders in Africa

Traditional leaders in Africa are individuals who wield authority within their communities based on long-standing cultural, historical, and social norms rather than formal political systems. They are widely respected for their roles in governance, conflict resolution, and the preservation of cultural heritage. Over time, the structure and functions of traditional leadership have evolved significantly, influenced by historical events such as colonialism, apartheid, and independence movements, as well as by processes of Westernisation, modernisation, and constitutional reforms. Today, traditional leadership operates within increasingly pluralistic state structures, where it must coexist and sometimes intersect with formal legal and political institutions.

A simplified pattern of the structure of traditional leaders includes:

- Chiefs, Kings, or Queens: The conventional leadership apex structure and symbol of unity, and the primary decision maker for the community.
- Council of Elders or Advisors: Council of Elders/Advisors, consisting of respected members of the community, who can even advise the community.
- Lineage heads: They often play a crucial role in managing the affairs of their respective family lines. Age grades and societies play a significant role in governance, as they are organised according to age or initiation and contribute to decision-making, conflict resolution, and the enforcement of community norms.
- Traditional courts: Where applicable, they (still) deal with matters of land disputes, marital issues, and minor offences, and they are presided over by chiefs, elders, or other designated individuals.

- Religious leaders: They provide spiritual guidance, preside over ceremonies, and serve as advisors to the communities. Depending on the system, they may also be integrated into the traditional leadership structure. Effective traditional leadership relies on deeply rooted cultural knowledge and heritage, wisdom and experience, integrity and honesty, empathy and compassion, conflict resolution skills, advocacy and community mobilisation skills, among other attributes. In fact, it fosters societal harmony with the respective communities.
- Traditional leaders: They can play a pivotal role in soil governance through their deep-rooted influence in local communities and customary systems. Their contributions span a range of activities, including land administration and management, the resolution of land-related conflicts, and the protection of communal natural resources. They often serve as custodians of customary land rights and play integral roles in local governance structures. Traditional leaders also contribute to the development and implementation of national land policies by articulating community interests, and they are frequently involved in environmental conservation efforts. Additionally, they help regulate agricultural practices, promote culturally rooted land use traditions, and support broader community development initiatives. Their active participation is essential for achieving inclusive, culturally appropriate, and sustainable soil governance across Africa.

17.1.3. Land tenure and traditional soil governance

17.1.3.1. Land tenure

Land tenure refers to the rights and arrangements regarding the use, control, and transfer of land. Secure land tenure is essential for effective soil management as it influences the farmers' willingness to invest in long-term soil health.

Land tenure in Africa is diverse and complex, varying significantly across the continent due to historical, cultural, and socioeconomic factors. The common land tenure systems include customary, freehold, leasehold, and public land tenure.

The simplified African regional land tenure systems comprise the following:

(1) East Africa: (Kenya, Uganda, Tanzania) - A Mixture of customary, freehold, and leasehold systems, and land tenure systems reforms are focused on formalising customary rights and improving governance.
(2) Southern Africa: (South Africa, Zimbabwe, Namibia) - Pluralistic approaches in land ownership due to colonialism, apartheid, land redistribution, and tenure reforms.

(3) West Africa: (Ghana, Nigeria, Côte d'Ivoire) - Predominant customary systems, with increasing pressure on land due to population growth and commercial agriculture.
(4) North Africa: (Egypt, Morocco, Algeria) - A mixture of state-owned, private, and communal lands, with varying degrees of formalisation and registration.

Community land in Africa has several distinct characteristics that vary across different regions and communities. This includes collective ownership, customary tenure systems, community rights to use, cultural significance, sources of essential community resources, and vulnerability to external pressures, and can be both a source of community conflicts and a basis for community livelihoods. It is integral to the social, economic, and cultural fabric of many African societies and embodies the interplay between traditional practices and modern legal frameworks.

17.1.3.2. Traditional and modern soil governance practices

Traditional and modern soil governance practices have evolved in response to shifting societal structures, agricultural systems, and environmental challenges. The central challenge today is to effectively integrate traditional knowledge with modern scientific approaches to establish sustainable and culturally relevant soil governance systems. Traditional practices include customary land tenure systems, shifting cultivation, crop rotation, fallowing to naturally restore soil fertility, indigenous knowledge systems, and communal labour arrangements. In contrast, modern soil governance emphasises national soil management strategies, such as integrated soil fertility management, climate-smart agriculture, and public–private partnerships. Harmonising these approaches offers a pathway toward resilient and inclusive soil governance frameworks in Africa.

17.1.3.3. Soil law implementation in community land

Soil law implementation refers to the legal frameworks and practices that govern land use management and the preservation of soil resources within a community's territory. It includes aspects of land rights, sustainable practices, regulatory frameworks, community engagement, conflict resolution, and awareness creation.

17.2. Soil law implementation by traditional leaders on community land

Traditional leaders enforce laws within their communities using a variety of mechanisms rooted in customary law, cultural norms and practices, and societal structures.

The enforcement of laws can differ depending on the community, while specific customs *inter alia* include:

- Community consensus: Traditional leaders often operate through community consensus, consulting with clans, families, or influential members to reach a collective agreement on matters. Their authority stems from the respect they command, and decisions are expected to be respected and honoured by community members.
- Customary trials and mediation: In cases of disputes or breaches of customary law, traditional leaders may conduct trials or mediation based on customary law. They gather evidence, listen to testimony, and make determinations that are binding within the community. In many jurisdictions in Africa, however, the criminal law enforcement has moved to state jurisdiction.
- Social pressure: Traditional leaders leverage social relationships and norms to enforce laws. Community members are discouraged from breaking rules, as this may result in social ostracism or loss of respect within the community.
- Restorative justice: Many traditional systems emphasise restorative justice, focusing on repairing societal harm by restoring relationships rather than merely punishing offenders. Leaders may facilitate discussions between the offending and aggrieved parties to reach mutually agreeable resolutions.
- Incentives and rewards: Traditional leaders sometimes use incentives to encourage compliance with laws and regulations. This can include public recognition, community support, or rewards for individuals who adhere to customary practices.
- Cultural sanctions: Non-compliance may result in cultural sanctions, such as fines, public shaming, or rituals intended to restore societal harmony. These sanctions reinforce the community's norms and motivate adherence to traditional laws and values.
- Accountability through elders and councils: Traditional leaders are often supported by elder councils or committees that assist in lawmaking and enforcement. They help to monitor adherence to customs and provide guidance on appropriate actions and sanctions.
- Education and awareness: Traditional leaders may conduct educational efforts to inform community members about laws and the importance of adhering to them for the community's well-being. The effectiveness of law enforcement by traditional leaders relies heavily on the support structures vested in them by

the state, their moral authority, the respect they command within the community, and the collective adherence to shared customs and beliefs.

17.3. Challenges facing the implementation of soil law in community lands

Implementing soil law on community land, particularly when involving traditional leaders, can present a range of challenges. These include, among others:

- Authority and jurisdiction conflicts: Traditional leaders may have their own systems of governance and dispute resolution, which could conflict with formal legal frameworks. This duality can create confusion over authority and jurisdiction, potentially leading to conflict. Soil management often involves multiple stakeholders, including local communities, government agencies, and the private sector. Different interests and objectives can lead to a lack of cohesive strategies, making it challenging to implement new soil laws.
- Inadequate legal awareness: Traditional leaders and community members may not be fully aware of soil laws nor receive adequate support or recognition from government authorities, which can lead to noncompliance or misunderstanding of legal requirements. This limits their authority and effectiveness in enforcing soil laws. Additionally, existing laws and regulations may not effectively address current soil threats, such as erosion, contamination, and degradation, nor do they encourage sustainable land-use practices.
- Cases of mismanagement: Even when soil laws are in place, enforcement can be weak due to a lack of political will or inadequate monitoring systems. Mismanagement and abuse of authority can create a culture of impunity, in which individuals and organisations are not held accountable for violating the law.
- Resource limitations: Implementing soil laws requires resources, such as funding for capacity building and awareness creation programs, materials for sustainable practices, alternative livelihoods for those affected by regulations, or technology for soil management. Traditional leaders in rural areas require access to these resources to bridge gaps among traditional practices, legal requirements, monitoring, and enforcement.
- Lack of awareness and knowledge: Traditional leaders are equipped with the necessary wisdom that, in addition, can acquire knowledge or training about modern agricultural practices and soil laws. This knowledge complementarity can foster effective implementation and enforcement, leading to best practices that prioritise sustainable soil management. They can be instrumental in making their communities more resilient by overcoming resistance to, for

instance, new regulations or practices introduced by soil laws that replace unsustainable traditional practices.

- Conflict resolution: Traditional soil governance structures may vary significantly between different communities based on the influence and power of traditional leaders, which can strengthen the rights of all in their community. The application of and adherence to soil law can differ significantly between communities depending on the influence and power of traditional leaders. Traditional conflict-resolution mechanisms aligned with legal processes can improve soil management.
- Climate change impacts: Traditional leaders have known about climate change before modern science detected it. Yet an improved scientific understanding of sustainable soil practices and environmental conservation among traditional leaders and community members can positively impact compliance with and the implementation of soil laws. Changing weather patterns and extreme weather events can exacerbate soil degradation, putting additional pressure on governance systems to respond effectively. Increased droughts, floods, and erosion, as well as biodiversity loss, can strain traditional coping mechanisms and require new approaches. Traditional leaders often have the power to adapt to these changing conditions while working within the constraints of existing laws.
- Land use conflicts: Customary land tenure systems can clash with statutory land laws. This can lead to confusion and disputes over land ownership and usage rights, hindering the effective implementation of soil conservation measures. Competition among agricultural, urban, and industrial land uses can also lead to conflicts that undermine sustainable soil governance. Rapid population growth is increasing pressure on land resources, leading to unsustainable farming practices and deforestation. This may call on traditional leaders to strike a balance between the needs of their communities and the need to protect soil resources. While engaging the community is crucial, traditional leaders can foster trust and collaboration on the importance of soil laws.
- Vulnerability of local communities: When it comes to giving effect to enforceable sustainable soil practices, traditional governance systems can promote and protect the rights and needs of local communities, particularly marginalised groups, women, youth, and people with disabilities. External actors, such as commercial farmers, mining companies, or government agencies, sometimes exert pressure on traditional leaders to prioritise economic development over soil conservation. Political affiliations and pressures can erode the authority of traditional leaders, leading to unsustainable land-use practices.
- Technological adaptation: The rapid development of new technologies for monitoring and managing soil health can be integrated into traditional

governance systems, leading to improved soil practices. Furthermore, a lack of comprehensive, accessible data on soil health, use, and management practices can hinder effective decision-making. Addressing these challenges requires a collaborative approach that considers both ecological and socio-economic factors in soil governance. In such processes involving traditional leaders, the government, communities, and other key stakeholders are essential to success.

17.4. Options for the role of traditional leaders in implementing soil law

Incorporating traditional leadership into the implementation of soil law can create a more inclusive and culturally relevant approach to managing soil resources, ultimately supporting the achievement of sustainable development goals in African communities. Traditional leaders play a crucial role in implementing soil law across various regions in Africa, leveraging their influence and local knowledge. Their roles in soil governance include:

17.4.1. Conflict resolution in implementing soil law

Conflict resolution in soil governance addresses disputes over land use, ownership rights, and resource management through culturally embedded practices and customary laws. Involving traditional leaders for conflict resolution ensures local buy-in as they have the necessary authority and respect within their communities to mediate conflicts, including those related to land and soil usage, which can minimise disputes and contribute to a more peaceful coexistence in the application of culturally appropriate methods and narratives that both resonate with community values, facilitate understanding and contribute to a resolution of soil conflicts (e.g. land tenure conflicts, resource allocation, encroachment, "land grabbing", environmental degradation and conflicting government policies). Thus, the effective conflict-resolution mechanism relies on the active involvement of traditional leaders in soil governance, as they are trusted for their authority, legitimacy, integrity, knowledge, and wisdom. It is essential to acknowledge the role of traditional leaders in conflict mediation and collaborative governance, and to include provisions for establishing multi-stakeholder committees that incorporate diverse voices. These committees should integrate traditional authorities into broader governance structures to promote sustainable practices and embed indigenous knowledge systems and early warning mechanisms for conflict into soil governance. By implementing these strategies, traditional leaders can help foster more sustainable, inclusive, and equitable land use across Africa.

17.4.2. Advocacy and awareness

Advocacy refers to the efforts to influence decision-makers and raise public awareness about the importance of soil governance. Traditional leaders can play a crucial role in mobilising the local population to recognise the importance of soil health, protect and sustainably utilise soil resources, and engage with local and national governments to promote national policies that protect soil resources and support sustainable agricultural practices.

17.4.3. Mismanagement

Mismanagement in soil governance frequently occurs during the implementation of soil laws, resulting from inadequate enforcement, poor planning, and a lack of expertise and training. Such deficiencies can lead to ineffective regulation, resulting in environmental degradation, economic losses, social inequality, and a decline in public trust. To mitigate these effects, it is essential to adopt robust strategies, including strengthening oversight mechanisms, enhancing transparency, building institutional and technical capacity, promoting public participation, creating incentives for compliance, enforcing penalties for violations, and fostering collaborative governance across all levels.

17.5. Legal mechanisms to strengthen the enforcement of soil law by traditional leaders

Some of the approaches can include the following non-conclusive set of measures:

- Corresponding customary and statutory land laws: Legal frameworks that recognise and respect customary land tenure systems, while promoting sustainable land management practices.
- Raising awareness and building capacity: Providing training and education to traditional leaders and community members on soil laws, sustainable land management practices, and the overall benefits of soil conservation.
- Strengthening enforcement mechanisms: Enhancing monitoring systems, increasing transparency, and holding individuals who violate soil laws liable.
- Empowering women: Ensuring that women have equal rights and opportunities in land ownership and decision-making processes.
- Addressing climate change: Implementing climate-smart agriculture practices and investing in adaptation measures to reduce the impacts of climate change on soil resources.

- Promoting sustainable livelihoods: Providing alternative livelihood options for those affected by soil conservation measures, such as eco-tourism, agroforestry, or small-scale enterprises.