

# Mapping out options for model legislation for sustainable soil management in Africa

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## 1 Introduction

Africa is the continent with the least soil degradation, while at the same time the pressure on soils is extremely high. Factors such as poverty, hunger, overuse, overpopulation and climate change are exacerbating this pressure. Hunger and poverty in Africa can only be overcome with fertile soil.

The protection of soil and the sustainable management of soils are preconditions for sustainable development and ultimately for the survival of humankind. Without sufficient areas of fertile soils, there is no food security and no chance to mitigate climate change. Degraded soils result in hunger, famine, migration and, under certain circumstances, even wars. Africa has experienced such deprivations in the past and, with increasing climate change, these hardships can even be exacerbated. Land preservation – and thus the sustainable management of soils – is required in order to achieve most of the Sustainable Development Goals of the United Nations 2030 Sustainable Development Agenda, and in particular the land degradation neutrality objective.

Although the effects of soil degradation are global, the appropriate management of soils must be implemented locally. The challenges are multifactorial, including ecological, social, cultural, economic, political and legal. Africa is the continent with the least land degradation, yet the pressure on soils is already enormous and continually increasing owing to a range of factors, including poverty, over-exploitation, population growth and climate change. Drivers of unsustainable soil management include overstocking, overgrazing, water erosion, landslides, and over-application of agrochemicals. Moreover, poor populations lacking the means to conserve often depend directly on land and other natural resources for immediate needs, which is an additional driver for land and soil degradation.

Sustainable soil management is an essential factor in overcoming the major challenges that confront African countries in the face of climate change, limited food supplies and declining biodiversity. Soil degradation causes hunger, poverty, migration and sometimes even conflict.

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Soil is a matter that is affected by a multitude of interests. In addition to the ecological and developmental dimensions, numerous economic, cultural and social interests are relevant to soil. Despite the overwhelming importance of soil, there is no uniform soil protection law in any African country. Rather, the protection of soil is often found in a variety of sectoral laws that are not primarily concerned with soil protection.

Based on a selection of three African countries (Cameroon, Zambia and Kenya), soil protection in Africa was analysed comparatively and by mapping out options for model legislation for sustainable soil management in Africa. This chapter reflects the underlying findings comparatively in view of the possible preparation of an African soil protection law.<sup>2</sup> The distinct country studies from Kenya, Cameroon and Zambia serve to comparatively expose the serious vulnerabilities of soil in Africa.

Relevant aspects covered are the lack of soil data and soil research, and its frequent unavailability or inadequacy. Existing laws are not sufficiently implemented in agricultural practices, while coherent soil policy is often still lacking in the legislation of many African countries. Finally, insecure land tenure rights pose numerous uncertainties in the presence of African legal pluralism. A common perception in African societies is linked to the presumption that landowners are entitled to use their land as they wish. And although governments have attempted to put legally binding standards for soil management in place, governmental entities often tend to lack the competence and financial means to enforce such standards. Finally, legal pluralism in many African societies between traditional and modern law leads to considerable legal uncertainties, especially regarding – but in no way limited to – land-use rights.

While mapping out options for model legislation for improved sustainable soil management in Africa, the chapter addresses intertwined, interdisciplinary and complex questions pertaining to soils, which may also be of comparative interest to the jurisdictions of other continents. The chapter provides special insights and recommendations that may be useful for African countries, Regional Economic Communities and African Union institutions in the consideration of establishing a framework protection basis for the benefit of generations to come.

## 2 Setting the scene

This section provides some background information which is relevant to understanding the various dimensions of the challenge to establish good governance to achieve

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2 Regarding the footnoting of sources in this chapter, only those sources which have not already been referenced in the country studies will be explicitly acknowledged in this chapter. Where sections of the chapter draw on information from the country studies, the relevant and underlying sources will not be repeated in this chapter and the reader is referred to the respective country study for further reference.

sustainable soil management in Africa. In the following sections, options to improve current overarching and sectoral legislation are presented.

First, some information is given about Africa's natural, economic and historical conditions. Secondly, the importance of soils for sustainable development in Africa is explained. Thirdly, the main drivers of soil degradation are outlined. Fourthly, the structure of continental and regional cooperation in Africa and the international governance of soil management is briefly described.

## 2.1 Africa in natural, historical, economic and political terms

The size of Africa is 30 million square kilometres, which makes it the world's second largest continent. The continent's population was estimated to be 1.2 billion in 2016. The major economic activity in Africa is agriculture and that is why soil protection is a pertinent issue on this continent. Other economic activities include mining, energy and investments. Africa also has a range of climatic conditions such as an equatorial climate, tropical climate, arid and semi-arid conditions, and subtropical conditions in the highlands. The vegetation in Africa reflects the climate but, generally, the continent is vegetative.<sup>3</sup>

With regard to the establishment of good governance to achieve sustainable soil management, it is important to mention that Africa has been colonised for centuries and that independence in most African states was achieved relatively recently at the beginning of the 1960s.

The very long period marked by the lack of freedom and sovereignty has left traces in various aspects of the African societal fabric, e.g., random state borders, pluralism of tenure rights, strong role of tribes, illegal and/or illegitimate foreign investment in land and soil, unfair trade practices, unfinished unification of African states, people's inferiority complex, and many more. This statement does not mean to convey that the colonial period is the only cause of the current challenges in Africa, particularly those just mentioned. But it would certainly not be appropriate to ignore the 'colonial hang-over effect'.

The economies of the more than 50 African states have developed differently. In some countries, industrialisation is already well-established. But several conditions prevail in most, if not all, African states: Large portions of the population make their living from agriculture, and the gross domestic product (GDP) is largely based on agricultural activities. Often, the majority of farmers are small-scale and thus vulnerable to external shocks due to climate or economic changes. National income often depends on the export of natural resources. The level of domestic processing is usually low. Foreign investment in land, agriculture and extraction of natural resources is an

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3 Detailed information can be found in the three country studies.

important economic factor. African states often face a high or very high level of debt, which strongly hampers the ability to vitalise economic development by stimulus programmes.

Most African states have developed a democratic and modern system separating legislative, executive and juridical powers. Some have approved very modern constitutions, in particular with regard to environmental protection and management of natural resources. Core challenges are the lack of sufficient resources and little clarity regarding the roles and responsibilities of ministries and other governmental and administrative entities. Thus, law implementation and enforcement often remain weak and ineffective. In addition, sustainable development efforts often lack attention to societal (justice) issues, e.g. inequality, discrimination, stigmatisation, tribalism and marginalisation.

## 2.2 Importance of soil

Soil is one of the most crucial natural resources. Despite its importance, the preservation of soil in Africa is precarious and this, in turn, places the future of all ecological functions in the very bedrock, as reported in the Cameroonian report. Soil is used in agriculture in the production of crops and other agricultural products; thus, it provides a solution to food insecurity. In this context, sustainable soil management is certainly required to end hunger in Africa – and is therefore the baseline challenge for all humans. Soil is the basis of all terrestrial life. In the Kenyan report, soil was described as the source of livelihood for organisms and humans. Soil also provides a habitat for innumerable living things that form part of the ecosystem. Soil is used in building infrastructure such as buildings, roads and other economic structures. In Kenya, soil has been recognised as having ecological, cultural and political dimensions.<sup>4</sup> The ecological usefulness of soil includes water and moisture retention, habitats for living organisms, and the decomposition of waste materials.<sup>5</sup>

The cultural usefulness of soil varies from one culture to another. Soil has a religious significance in some communities and is used for cultural decorations in other communities. Soil also has economic value. It stores numerous minerals and other natural resources that are useful to the economies of countries. Soil is also sold in the form of land as property. Indeed, as stated in the Cameroonian report, soil has crucial ecological and socioeconomic functions.

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4 Allan (2008: 61).

5 Howard & Lawson (2015).

## 2.3 Main soil threats, degradation drivers and challenges

In the following paragraphs, the threats, degradation drivers and challenges of soil degradation relevant to Africa are summarised. Soil degradation is a change in soil health status resulting in a diminished capacity of the ecosystem to provide goods and services for its beneficiaries. From the three reports provided by Kenya, Cameroon and Zambia, there are numerous factors that affect the nature, quality and structure of soil.

### 2.3.1 Agriculture

In Kenya and Cameroon, agriculture is a major economic activity. Poor agricultural practices are one of the threats to soil structure and its functions, in particular the application of agrochemicals and fertilizer without knowledge of existing soil nutrients and farming with no rotational practices or seasonal breaks. Poor methods of bush and forest clearing, such as burning, leads to the death of soil organisms that contribute to its nutrients. Overgrazing by running excessive livestock numbers per unit area not only destroys protective vegetative cover, but also leads to soil compaction – thus negatively affecting soil profile and aeration. In contrast, Zambia maintains a high acreage of underutilised land, and has a medium to high potential for agriculture. Within the unused arable land area, however, a reduction of forest area may lead to the destruction of the natural environment.<sup>6</sup>

### 2.3.2 Mining

Mining is the excavation of mineral resources from their natural setting, which is usually soil. The economic activity of mining is useful but its effect on soil is alarming. Mining leads to soil degradation through the excavation process. Cameroon, Kenya and Zambia are richly endowed with mineral deposits and the mining of those ores leads to destruction of soil profile and productivity.

### 2.3.3 Industrialisation

The growth of industries is another threat to soil. Industrial processes and products affect the quality of soil in several ways. Industries deposit their waste and effluents on soil according to set standards and guidelines. The waste contains dangerous

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6 Japan Association for International Collaboration of Agriculture and Forestry (2008: 36).

chemicals and non-biodegradable substances, which negatively affect soil decomposition. Greenhouse gases cause acidic rain that affects soil pH. In addition, industrial activities require a large operation area, which necessitates the clearing of land, and this may require deforestation. It is important to bring to the fore that a significant proportion of industries in Cameroon are not certified by international environmental management organisations which require industries to internalise their external effects on the environment.

#### 2.3.4 Urbanisation

Urbanisation refers to increasing population growth in urban areas. Most cities in Africa are highly populated and have extreme population densities. This is because most people migrate from rural to urban areas in search of employment. The high population density in urban areas, as well as the increase in development in these areas, has led to deforestation and also soil compaction. Urban sprawl leads to the conversion of agricultural land and wetlands into settlement areas, thus affecting soil use.

#### 2.3.5 Weather and climate change

Climate change, meaning changed temperatures and weather events (timing, duration and strengths), directly and indirectly affects soil functions. Flooding which erodes soil, as well as water scarcity and droughts, may affect the availability of fertile soils and the structure and quality of soils. Floods may also have the effect of increasing contamination by spreading contaminants. Even the timing of rainfall may have detrimental effects on soil quality. Non-resilient small-scale farmers, particularly, may be unable to cope with these changes. By contrast, sustainable soil management may cause an increased uptake of carbon and could thus be regarded as a mitigation or adaptation measure to fight climate change.

#### 2.3.6 Topographical constraints

Topography may exacerbate soil erosion and floods. Uneven topography, as found in Kenya, Cameroon and Zambia, causes rainwater to flow down steep gradients, thus washing soil from the highland areas and later depositing it on the lowland areas. This erosion therefore affects the soil structure of the highland areas.

### 2.3.7 Poverty

Poverty is a social factor that affects the quality of soil. Poverty has forced humans to encroach on marginal lands and forests, where they burn charcoal and gather firewood, which leads to deforestation and land degradation. Furthermore, poverty is often associated with poor agricultural practices and overuse of natural resources. Finally, poverty increases the proclivity of local communities to engage in illegal and illegitimate land acquisition.

### 2.3.8 Poor law implementation and enforcement

Weak law implementation and enforcement is an additional social driver of soil degradation.

### 2.3.9 Illegal or illegitimate foreign investment in land

Finally, foreign investment in land that is illegal or illegitimate often widely ignores existing legal requirements to protect soil quality. Thus, these forms of investment constitute an additional driver of soil degradation.

## 3 Framework for soil legislation

### 3.1 International framework

There are various international instruments and so-called soft laws that create the obligation of soil protection. The first important obligation relating to soil protection is the 2030 Agenda for Sustainable Development which institutes the Sustainable Development Goals (SDGs). It sets out obligations that help with soil conservation and management. These include Goal 12, which aims to ensure sustainable consumption and production patterns, and Goal 13, which encourages urgent action to combat climate change and its impacts. Furthermore, and most relevant, Target 15.3, which requests states “to strive to achieve a land degradation neutral world by 2030” needs to be highlighted. The United Nations Convention to Combat Desertification (UNCCD) has declared itself as lead organisation to implement the land degradation neutrality (LDN) objective. Certain overlaps with the Convention on Biological Diversity (CBD) in terms of legal scope and mandate regarding soil biodiversity may occur, while the United Nations Framework Convention on Climate Change (UNFCCC) also creates obligations that reduce climate change thus reducing the threat of soil degradation. The

Ramsar Convention on Wetlands requires contracting parties to formulate and implement plans that ensure conservation and wise use of wetlands within their boundaries.

### 3.2 National framework

The following section addresses whether and what overarching provisions are required in order to have a solid baseline for sectoral provisions dealing with specific soil threats such as urbanisation, industrial facilities, use of fertilizers, pesticides and more. These overarching provisions might form a kind of framework soil legislation. To this end, first a short summary of the three country studies will document the current legal situation in the three countries, identifying substantial shortcomings concerning both a coherent soil policy and legislation. Before the specific options are presented, the objective and value of overarching provisions and the political buy-in are explained. Overarching provisions may be in the form of constitutional provisions or as a legislative act which is regarded as a leading framework for sectoral provisions.

### 3.3 The country studies' findings

None of the national constitutions of the three countries entails explicit or substantial provisions on sustainable soil management. This is actually not surprising since – as far as is known – no constitution worldwide provides such norms. Moreover, the relationship of sustainable soil management to poverty and hunger prevention and to climate change is not mentioned in the constitutions of the three countries. To a certain extent, it appears that the importance of soils as a natural resource was not fully understood when the constitutions were drafted and adopted. However, all three constitutions set out ambitious provisions on natural resources, on environmental protection and, partly, even on benefit-sharing. The term ‘resource’ needs to be understood widely to encompass also soils. The constitutions also do not cover specific provisions on the responsibilities of foreign investors. Furthermore, the three country studies conclude that there is no overarching policy on sustainable soil management and thus no overarching and coherent soil legislation. The criticism finds a sectoralisation and compartmentalisation regarding air, water and other natural resources have been put in place, which leads to a kind of fragmentation of sectoral provisions regarding the various soil threats.

Furthermore, it seems that none of the analysed legislation entails provisions on the implementation of the objective “land degradation neutrality”. This objective is one of the 169 targets of the 2030 Agenda for Sustainable Development which has been

adopted by the United Nations General Assembly adopted on 25 September 2015.<sup>7</sup> The Agenda includes 17 SDGs and 169 accompanying targets. Importantly, the Agenda stipulates commitments for both developing and developed countries. SDG 15 and Target 15.3 are the most pertinent ones as SDG 15 requests states “to halt and reverse land degradation” and Target 15.3 demands that states “by 2030, combat desertification, and restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world”.

The UNCCD, which has established itself as the international lead organisation for the land degradation neutrality (LDN) objective,<sup>8</sup> has interpreted the term as follows:<sup>9</sup>

Land degradation neutrality is a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems.

As soil is an essential element of land, the LDN objective is directly applicable to soils. In addition, the definition underlines that the “amount and quality” has to “remain stable or increase.” That means essentially that the amount and quality of soil must not diminish. As land/soil degradation cannot be avoided completely, restoration or rehabilitation interventions must be in place in order to achieve neutrality.<sup>10</sup> Thus, the investigated legislation entails neither an obligation to achieve LDN within a specific timeframe, nor a requirement to set specific targets based on agreed indicators, and there are no specific LDN-related planning instruments.

### 3.4 Recommendations

The following sub-section first addresses the objective and value of overarching provisions on sustainable soil management (framework legislation) and discusses the advantages from the perspective of policymakers (political buy-in). Secondly, specific options with regard to constitutional provisions, soil policies and legislation are put forward. Finally, some thoughts are provided on the use of sanctions and penalties.

#### 3.4.1 Objective and value of framework legislation and political buy-in

A framework legislation on sustainable soil management could and should stress the ecological functions of soils and the dimensions affecting society. The ecological function could be summarised as follows: Soils are the basis for food production and the

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7 See <https://bit.ly/3p24MMY>, accessed 10 February 2021.

8 Boer et al. (2016: 63).

9 See <https://www.unccd.int/actions/achieving-land-degradation-neutrality>, accessed 10 February 2021.

10 Ehlers (2016: 75).

production of plants for renewable energy. Soils sequester carbon and are therefore crucial in the fight against climate change. Soils host biodiversity and thus play a vital role in the world's biological cycle by, among other things, storing nutrients or filtering hazardous substances from groundwater. They also have cultural and biological significance.

Thus, the dimension of soils relating to society is in safeguarding human welfare in general, and more particularly in preventing hunger and eradicating poverty. Furthermore, soils play a role in the mitigation and adaptation to climate change, as well as the maintenance and fostering of biodiversity. Finally, healthy soils play a part in the prevention of forced displacements, societal tensions, and political or even military conflicts. In order to fulfil these ecological functions and the dimension relating to society, soil needs to be legally regarded as a natural resource whose ecological services have to be maintained and fostered.

Moreover, the objective of LDN could be established as a binding obligation. In addition, the overarching planning instruments to achieve LDN could be clarified and established by a framework legislation. A framework legislation could also clarify the general institutional roles, competencies and responsibilities, including the establishment of a permission regime (prior written authorisation) for activities with severe risks for soils.

With respect to the advantage of such overarching provisions, three primary aspects should be mentioned in legally declaring soil as a natural resource and stressing its ecological functions: First, the costs of rehabilitation or restoration by far exceed the costs of sustainable management – which has been evidenced by the results of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) initiative, *Economics of Land Degradation*.<sup>11</sup> In that regard, it is simply good sense to impose a general obligation to manage soil sustainably and to achieve land degradation neutrality.

Second, owing to the interconnectedness of combating the climate crisis and poverty, and safe-guarding natural resources and development options with soils, sustainable soil management is one more required ingredient – along with, among others, avoidance of societal tensions and political and military conflicts, birth control, and fair-trade patterns – to achieve an improvement in the economic conditions in African countries and to realise sustainable development.

Thirdly, as climate change is very high on the international political agenda, a number of international funds have been established and made accessible for climate mitigation and adaptation projects. As projects to improve soil quality mostly, if not always, have a positive effect on the carbon sequestration function of soils, international funds supporting climate mitigation and adaptation could also be used for soil-related projects.

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11 Initiative “Economics of Land degradation”, further information to be found at <https://www.eld-initiative.org/>, accessed 10 February 2021.

### 3.4.2 Constitutional provisions

Sustainable soil management and LDN implementation could be addressed by constitutional provisions. The constitutions of the three countries analysed already entail strong provisions on natural resources. It is clear that the term ‘natural resources’ encompasses soil.

First of all, it needs to be stated that an analysis of the valid national provisions is necessary before deciding on amending the existing rules. Two options to strengthen sustainable soil management should be recommended here. In any case, it seems to be reasonable to emphasise legally that soil is a natural resource which carries out essential ecological functions which are linked to most relevant social and societal implications, as outlined above. In particular, the interface of sustainable soil management to climate change should be explicitly mentioned by constitutional provisions. A second option which has to be seen as an additional bid would be to integrate the LDN objective as a constitutional obligation for all governmental entities. This obligation could also be extended to all relevant actors in society.

Finally, the imposition of a particular responsibility towards the sustainable development of the national economy could be considered for foreign investors. The supporting argument would be that foreign investors are usually in a very strong position. Thus, binding them by constitutional obligation would be appropriate. A negative consequence of such a provision could be that a country would need to document its dependence on foreign investment. On the whole, such a provision could be beneficial, but would need to be carefully drafted.

### 3.4.3 Soil-related policies

Comprehensive and coherent soil policies are a further option to promote sustainable soil management in African countries. Such policies must clearly be based on constitutional provisions. The advantage of soil policies is that they fill the gap between legal norm and subsidiary standards and indicators. They could address how to get the ‘soil engine’ established and continuously running. Obviously, in order to be comprehensive and coherent, the policies need to address all soil health drivers and all threats. In addition, they need to provide an approach to LDN implementation – including measurement of the status quo, indicators, targets, measures and institutions. The same goes for sustainable soil management in general. The necessary scientific bodies must be established, personnel recruited, information gathered, and compilation and synthesis need to be organised. In addition, soil policy could also address the involvement of private actors and civil society.

#### 3.4.4 Overarching soil provisions

It has been argued that overarching provisions on sustainable soil management would be beneficial. Overarching provisions could be included in the constitutions. The provisions should be accompanied by coherent soil policies. In addition, or even instead of the constitutional provisions, overarching provisions could be imposed via legal instruments, such as acts, depending on the constitutional requirements. Basically, there are two options for overarching provisions via a framework legislation.

Option 1 is a framework legislation that entails the crucial framing requirements, which would then coordinate sectoral provisions with respect to all soil drivers. Such a framing legislation would have to clarify that soils are a natural resource which provides ecological services. Furthermore, the services for the environment also need to be addressed if this has not already been implemented by the constitution. Finally, the obligation to achieve LDN could also be mentioned in the framing legislation.

With regard to the control mechanism, the framing act should establish a permission regime for activities with severe risks for soils. The activities for which an *ex-ante* permission is required need to be undoubtedly determined in order to avoid any misunderstanding. In order to achieve LDN and to implement this objective, planning instruments to calculate the ongoing degradation and the envisaged restoration need to be established as well. It would also be beneficial if the framing legislation determines – at least roughly – the roles, competencies and responsibilities of the various governmental entities with regard to LDN management; the environmental quality standards, emission limit values and technical standards; the regional standards which fit the regional specificities; and the permission regime.

Particular regulatory provisions concerning the various drivers of soil degradation should not be part of the framework legislation. However, it should be ensured that soil management-related environmental and technical requirements are implemented through the other sectoral provisions. This approach has been successfully applied by Germany's soil protection governance – at least with regard to soil contamination.<sup>12</sup> The German federal Soil Protection Ordinance entails specified and legally binding environmental quality standards and emission limit values. These standards have to be complied with through the implementation of other sectoral provisions, for example the mining act. It is important to note that this regulatory approach will only work if specified standards are adopted by the framework legislation for both contamination and all other forms of soil degradation and if these standards are legally binding – so that these standards have to be enforced via the sectoral provisions.<sup>13</sup>

Option 2 would be a kind of holistic soil legislation for all drivers and sectors which regulate all aspects mentioned for option 1. In addition, all regulatory instruments for

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12 Ginzky et al. (forthcoming 2021).

13 Ibid.

all soil drivers and all soil threats could be integrated in this framework legislation. It seems that this would perhaps be an opportunity if in an African country no regulation on sustainable soil management exists, which is highly unlikely. Thus, this option would lead to much duplication of existing regulations, which has occurred, for example, with regard to the regulation of pesticides. Furthermore, a purely soil-oriented regulation of activities which actually affect several environmental aspects would simply be inappropriate. Thus, in the case of advanced legislation on the protection of the environment, option 1 clearly seems to be more reasonable.

#### 3.4.5 Penalties and sanctions

Next to all these planning and prior control instruments it is also reasonable to consider incentives for compliance. From a legal perspective, incentives could primarily be sanctions in all legal forms: fines, civil rights obligation to restore land/soil degradation and even criminal sanctions such as penalties. All these sanctions must be both proportionate and severe enough in order to set an incentive to avoid these sanctions. A fine for a foreign investor which is related to the average income of the national population would probably not be severe enough, for example. Next to the sanctions mentioned above the threat to blame the reputation of an enterprise and/or a politician could also be a quite effective instrument to foster the motivation for compliance.

## 4 Climate change, land and soil

### 4.1 Intergovernmental Panel on Climate Change findings

Soil protection is imperative in light of the far-reaching and heavily adverse social and economic effects that result from its neglect. This seems particularly important in the light of Africa's extreme vulnerability to the impacts of climate change.<sup>14</sup> This can also be said with reference to the Intergovernmental Panel on Climate Change (IPCC). Because of its scientific and intergovernmental nature, the IPCC provides rigorous and balanced scientific information. In the UNFCCC, explicit reference is made to the IPCC under Article 21 in "that the Panel can respond to the need for objective scientific and technical advice."

With its *5<sup>th</sup> Assessment Report (AR5) on Climate Change*,<sup>15</sup> the IPCC has most rigorously reviewed and assessed scientific, technical and socioeconomic information produced worldwide relevant to the understanding of climate change. The

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14 Ruppel & von Finckenstein (2017: 343).

15 Report available from <http://www.ipcc.ch/report/ar5/>, accessed 28 May 2020.

mentioned report is of great relevance with regard to all aspects of climate change and contains a solid base for further debate on this important topic. Robust scientific knowledge about climate change plays an overarching role. By means of effectively and objectively assessing such scientific knowledge and the prevailing uncertainty, the IPCC can provide the world with the best possible and much-needed evidence of climate change-related impacts.

The IPCC's analysis of observed climate trends and future projections reveals that it is very likely that mean annual temperature has increased over the past century over most of the African continent,<sup>16</sup> and that temperatures on the continent will rise faster than the global average increase during the 21st century.

### **Selected executive summary statements of the IPCC AR5 Africa chapter<sup>17</sup>**

Evidence of warming over land regions across Africa, consistent with anthropogenic climate change, has increased (high confidence).

Mean annual temperature rise over Africa, relative to the late 20th century mean annual temperature, is likely to exceed 2°C in the Special Report on Emissions Scenarios (SRES) A1B and A2 scenarios by the end of this century (medium confidence).

A reduction in precipitation is likely over Northern Africa and the southwestern parts of South Africa by the end of the 21st century under the SRES A1B and A2 scenarios (medium to high confidence).

African ecosystems are already being affected by climate change, and future impacts are expected to be substantial (high confidence).

Climate change will amplify existing stress on water availability in Africa (high confidence).

Climate change will interact with non-climate drivers and stressors to exacerbate vulnerability of agricultural systems, particularly in semi-arid areas (high confidence).

Climate change may increase the burden of a range of climate-relevant health outcomes (medium confidence). Climate change is a multiplier of existing health vulnerabilities (high confidence), including insufficient access to safe water and improved sanitation, food insecurity, and limited access to health care and education.

Growing understanding of the multiple interlinked constraints on increasing adaptive capacity is beginning to indicate potential limits to adaptation in Africa (medium confidence).

There is increased evidence of the significant financial resources, technological support, and investment in institutional and capacity development needed to address

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16 With the exception of areas of the interior of the continent, where the data coverage has been determined to be insufficient. See Niang et al. (2014: 1206).

17 Extract from Niang et al. (2014: 1202–1204).

climate risk, build adaptive capacity, and implement robust adaptation strategies (high confidence).

Climate change and climate variability have the potential to exacerbate or multiply existing threats to human security including food, health, and economic insecurity, all being of particular concern for Africa (medium confidence).

AR5 presents strong evidence that the impacts<sup>18</sup> of climate change in Africa are already being felt across various sectors. Climate change poses challenges to economic growth and sustainable development and to the various facets of human security. Although detection of and attribution to climate change are often difficult given the role of drivers other than climate change, there are substantially more impacts in recent decades now attributed to climate change.<sup>19</sup> Various examples, however, show that climate change exerts extensive pressure on different ecosystems such as terrestrial, freshwater, and coastal/ocean ecosystems.<sup>20</sup> The health, livelihoods and food security of people in Africa are all affected by climate change. And as “Africa as a whole is one of the most vulnerable continents due to its high exposure and low adaptive capacity”,<sup>21</sup> innovation and technology, smart policymaking, high levels of government attention, effective diplomacy, and international cooperation are required in order to effectively address the current and future challenges related to climate change.

Climate change will amplify existing risks and create new risks for natural and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development.<sup>22</sup>

Africa is most vulnerable to climate change owing to the existence and interaction of multiple stresses – endemic poverty; complex governance and institutional dimensions; limited access to capital, markets, infrastructure and technology; ecosystem degradation; complex disasters and conflicts; and low adaptive capacity. Yet, as a global problem, climate change calls for multilateral solutions as opposed to unilateral approaches, in particular if these are confrontational. It is clear that required global emissions reductions cannot be achieved in developed countries alone. As a consequence, both developed and developing countries will have to transform themselves into low-carbon economies. This will require efforts at various levels, including substantial

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18 Impacts of climate change are the “effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. Impacts are also referred to as consequences and outcomes. The impacts of climate change on geophysical systems, including floods, droughts, and sea level rise, are a subset of impacts called physical impacts.” IPCC (2014b: 5).

19 IPCC (2014a: 7).

20 See Niang et al. (2014: 1214).

21 Ibid.: 1205.

22 IPCC (2014b: 13).

changes in lifestyle, in particular in industrialised countries. Equally important is major investment in low-carbon technology and modern technology transfer to, and capacity-building in, Africa.

The IPCC, in its findings on global warming of 1.5°C (2018 Report),<sup>23</sup> and climate change and land (2019 Report),<sup>24</sup> looked closely at the relationship between soil and the impact of climate change. It acknowledges that human changes in land use result in atmospheric carbon being stored in plants and soil and this is differentiated from natural CO<sub>2</sub> stored in the land.<sup>25</sup> Drought and dryness due to global warming – an increase in global temperatures of 1.5°C to 2°C – is said to have an impact on soil moisture, particularly in areas of the southern African region.<sup>26</sup>

Soil degradation is a way in which terrestrial carbon can be returned to the atmosphere.<sup>27</sup> The ocean provides important services, including the regulation of atmospheric composition via gas exchange across the boundary between ocean and atmosphere, and the storage of carbon in vegetation and soils associated with ecosystems such as mangroves, salt marshes and coastal peatlands.<sup>28</sup> As such, soil degradation upsets the balance of terrestrial carbon and causes this carbon, once previously stored, to return to the atmosphere.<sup>29</sup>

Soil degradation in the form of soil erosion can be expected to occur in areas where there is higher rainfall than is usually expected, thus wearing away the soil deposits present.<sup>30</sup> Soil degradation refers to a subset of land degradation processes that directly affect soil.<sup>31</sup>

Soil desertification is discussed in detail in Chapter 3 of the 2019 Report.<sup>32</sup> The first mention of soil carbon sequestration can be found in the 2018 Report where the IPCC makes mention of soil carbon sequestration as a method of accumulating negative carbon emissions through the Carbon Dioxide Removal Project.<sup>33</sup> In an attempt to keep global temperatures below 2°C, the use of soil carbon sequestration is the process of “enhanced weathering of minerals where natural weathering to remove CO<sub>2</sub> from the

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23 The full title of the report being: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. See IPCC (2018).

24 The full title of the report being: An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. See IPCC (2019).

25 IPCC (2018: 114).

26 Ibid.: 196.

27 Ibid.: 125 and 219.

28 Ibid.: 227.

29 Govind & Kumari (2014: 2).

30 IPCC (2018: 216).

31 IPCC (2019: 350).

32 Ibid.: 251–306.

33 IPCC (2018: 17).

atmosphere is accelerated, and the products stored in soils, or buried in land/deep ocean”.<sup>34</sup> Soil carbon sequestration, although a rather scientific methodology, has proved to be an example of a negative emission technology (NET) that would be beneficial in mitigating CO<sub>2</sub> emissions and decreasing climate change impacts.<sup>35</sup> The IPCC also acknowledges the benefits of soil carbon sequestration provided that it can result in “improved biodiversity, soil quality, and local food security”.<sup>36</sup> Soil carbon sequestration and biochar were discussed under Section 4.3.7.3. of the 2018 Report.<sup>37</sup> According to the IPCC, “[t]he potential for soil carbon sequestration and storage varies considerably depending on prior and current land management approaches, soil type, resource availability, environmental conditions, microbial composition and nutrient availability among other factors”.<sup>38</sup>

Sustainable land management describes “the stewardship and use of land resources, including soils, water, animals and plants, to meet changing human needs while simultaneously assuring the long-term productive potential of these resources and the maintenance of their environmental functions”.<sup>39</sup> By introducing soil management practices on an extensive scale, soils can be used as a global carbon sink to help achieve a net removal, depletion or mitigation of overall CO<sub>2</sub> levels within the atmosphere.<sup>40</sup> Exercising sustainable soil management practices can help to tackle food security and climate change challenges faced by agricultural systems.<sup>41</sup>

Agricultural land use contributes significantly towards the emission of greenhouse gases; at the same time, agriculture has enormous mitigation potential. Agriculture is susceptible to impacts of climate change such as water shortages, extreme weather and other factors that affect productivity. Smallholder agricultural systems can adapt to climate change by adopting climate-smart practices, increasing the resilience of agricultural systems by protecting natural resources and related livelihoods, particularly of the most vulnerable, through adaptation measures. Addressing global poverty requires addressing the resilience of smallholder agriculture to climate change impacts. While these are often rather technical to include in primary legislation, laws can identify these matters as a priority for the competent authority or provide indication that subsidiary legislation will provide further details. While improvements in carbon and nitrogen management will contribute to the reduction of emissions, climate adaptation and food security objectives should also be policy imperatives.<sup>42</sup>

All three country reports reflect the interrelatedness of soil and climate change. And while the climatic conditions differ across the African continent, it becomes most apparent that – from a policy perspective – both sustainable soil management and the protection against the impacts of climate change reflect two sides of the same coin.

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34 Smith (2016: 1315).

35 Ibid.: 1316–1319.

36 IPCC (2018: 17).

37 Ibid.: 345.

38 IPCC (2019: 192).

39 Ibid.: 100.

40 Paustian et al. (2019: 568).

41 IPCC (2019: 500).

42 FAO & UNEP (2020: 630–632).

## 4.2 Recommendations

More research is required to understand the complex interconnections of land, soil, climate, water, society, sustainability and food, especially in Africa. In terms of technical and legal principles on adapting to climate change from the point of view of soil protection, further action on how to implement climate protection in soil protection law becomes apparent. The aims of climate-related soil protection should be introduced in accordance with other protected natural resources and political objectives, while the measures should be introduced into an assessment framework.

The measures should provide a basis for the legal analysis and evaluation of the feasibility of soil protection related to climate functions. In this light and also in support of the Nationally Determined Contributions (NDCs), a legal framework should be established to offer effective instruments in order to implement climate ambitions in Africa. Significant gaps in the NDCs and contained commitments need to be bridged and national governments might consider (re-)evaluating national, regional and transformative response options and policy instruments. More inclusive forms of socially just and more equitable governance processes and institutions should also be considered.

## 5 Agriculture

Agriculture in this section is split in two – crop growing and livestock. The first part of this section addresses crop growing while the second focuses on livestock.

### 5.1 Agriculture – crop growing

This section starts with a summary of the agriculture sector in Cameroon, Kenya and Zambia, with specific focus on crop growing.

#### 5.1.1 Cameroon

The economy of Cameroon is largely agrarian, employing over 80% of the country's population. It is dominated by subsistence small-scale farming practices which are unsustainable and are at the forefront of massive soil degradation such as 'slash-and-burn' – which underpins food production and livelihoods in Cameroon and many other countries. The slash and burn farming practice includes several phases: (i) clearing of a portion of forest; (ii) burning of the plant debris; (iii) cultivation of the land, generally for a brief period; (iv) leaving the land fallow, generally for a long period of time.

In the coastal lowlands, intense chemical fertilizers and pesticides are used on large-scale plantations. These fertilizers and pesticides are not only harmful to the soil but also have detrimental effects on the underground water aquifers and the environment as a whole. The peasant subsistence small-scale farming practices carried out in this zone suffer a lot owing to declining soil fertility and a drop in agricultural output.

### 5.1.2 Kenya

Kenya has recently been ranked as a low middle-income economy and the fourth largest economy in sub-Saharan Africa. Inevitably, thousands of hectares of highly productive agricultural farmland have been converted into satellite cities with massive infrastructural developments which continue to pile pressure on decreasing agricultural soils to meet food demands of the growing population, with the consequence that soil and environmental degradation in Kenya have been on the rise in recent years.

Agriculture is the backbone of the Kenyan economy and is practised on large, small and subsistence scales. In order to boost production, there has been an increase in mechanisation, use of technology, and agricultural chemicals in the country, as well as importation of sub-standard fertilizers and other agrochemicals, leading to soil and water pollution. In irrigation schemes, for instance, high soil contamination as a result of using uncertified chemicals has been recorded in paddy rice production in some areas of the Mwea Irrigation Scheme.

Most of the soils used for agriculture in Kenya require constant nutrient replenishing, whereas the application of sub-standard fertilizers greatly contributes to soil degradation. One point to note in terms of understanding the political will to regulate the effect of fertilizers on soils in Kenya is that smuggling of sub-standard fertilizers in Kenya is sometimes done in collusion with government institutions. The Third Medium Term Plan (2018–2022) of Kenya's Vision 2030 identifies low and declining soil fertility due to poor farming methods as one of the main challenges facing the agricultural sector. Extension services, if properly designed and implemented, can improve agricultural productivity; however, the coverage of Kenya's agricultural extension system remains grossly inadequate.

Agriculture in itself may be counter-productive to soil health, as it involves land clearing, overgrazing caused by large livestock herds, charcoal and wood extraction, cultivation on steep slopes, bush burning and soil nutrient mining, among many other uses. Unsustainable agricultural practices and poor soils necessitate the use of fertilizers to improve productivity, but these fertilizers, as pointed out above, negatively affect the quality of soils. Most of the agricultural activities in Kenya are subsistence in nature and the farmers have yet to embrace modern methods of food production. As such, practices such as vegetation cover burning, as a way of cultivating virgin lands, is still rampant.

### 5.1.3 Zambia

Zambia is the seventh largest copper producer globally, and mining contributes over 75% to the country's total export value. Owing to the falling prices of copper on the global market, the country has over the years embarked on programmes to diversify its economy in order to reduce overdependence on copper. Agriculture has been tipped to supplement the copper contribution to the national economy. The quantity and nutritional quality of agricultural products for supporting human health largely depend on soils. Only healthy soils can provide the needed ecosystem services and secure increased supplies of agricultural produce to support a country's economy. Despite this expectation from agriculture, most of the sector legislation does not specifically address soil-related issues that have been pointed out as driving soil degradation. One reason for this is that the sector is still addressing one of its policy targets of reviewing its legislative and policy framework. It is hoped that this process can be completed speedily in order to ameliorate major challenges in the sector.

While about 58% of Zambia's total land area is potentially suitable for agricultural production, only about 15% of this area is under cultivation. This means that the country has a medium to high potential for agriculture; yet a high underutilised acreage continues to exist and, in turn, creates undue soil pressure for the limited land parcels that are used. The Zambian agricultural sector comprises crops, livestock and fisheries, with three broad categories of farmers: small-, medium-, and large-scale. Most Zambians are subsistence farmers, generally producing staple foods such as maize, sorghum, millet and cassava, with occasional marketable surplus. Medium-scale farmers produce maize and a few other cash crops such as cotton, groundnuts, sorghum, rice, sunflower seed, coffee, as well as sugar and fruits, while large-scale farmers produce various crops such as sugar, soybeans, coffee, groundnuts, rice, tobacco, paprika, wheat and cotton as well as horticultural produce. Owing to low crop yields, there is heightened use of chemical fertilizers, which in the long run compromise soil fertility.

Similar to the cases of both Cameroon and Kenya, traditional cultivation systems like shifting cultivation and slash and burn, also known locally as *chitemene*, have resulted in soil degradation and other negative impacts on the general environment. Further, unsustainable practices in crop cultivation, involving tillage rows which run against, rather than along, the natural contours of slopes, end up concentrating water-flow in such a manner as to cause soil erosion. Soil acidity, also a documented problem in Zambia, is caused by the injudicious sustained use of inorganic fertilizers in order to improve crop yields.

The current Second National Agricultural Policy (SNAP 2016–2020) has not achieved the much-needed sector legislative reform that was set as a target, although a number of positive initiatives such as conservation farming have been implemented. Conservation farming is relevant to sustainable soil management and consists of a farming system suited to the needs of crops and the prevailing conditions of a locality,

thus enhancing resource-saving agricultural crop production, while concurrently protecting the environment from soil erosion and land degradation. The principles of conservation agriculture mainly consist of three linked components: reduced soil disturbance, maintenance of permanent soil covers, and species diversification which is favourable for sustainable soil management.

#### 5.1.4 Public law

In the case of Kenya and Zambia, devolution as a form of governance is a golden opportunity to introduce more specific soil legislation.

In all the three countries, slash and burn practices have been identified as detrimental to soil health. In Zambia these practices are prohibited by the Environmental Management Act, while in Kenya the prohibition is pursuant to the Forest Conservation and Management Act.

In the case of Cameroon, the 1994 Forest Act proscribes slash and burn practices, although the legislation on environmental and social impact assessment does not address slash and burn practices or the related Ankara agricultural methods, a traditional farming method practised by farmers in the Western Highlands of Cameroon. Ankara involves dry plant waste being placed in the middle of beds, then partly covered with soil and burnt.

The impact of misusing chemical products (pesticides and fertilizers) on soil health is well noted and articulated in all three country reports and is rightly identified under “low hanging fruits”. All three country reports explain the deliberate country initiatives instituted to address this soil-specific challenge. The monitoring and control of fertilizers in Cameroon is reportedly difficult and open to corrupt practices, as is also pointed out in the case of Kenya, where some level of illegal practices in the sector renders law implementation and enforcement extremely difficult.

In Kenya, as in the other two countries, the use of sub-standard fertilizers has negatively affected soil sustainability, especially since smuggling of sub-standard fertilizers and other illegal practices are prevalent in the government procurement processes.

In Zambia, in order to boost agricultural output, a shift in cultivation methods from indiscriminate chemical fertilizer usage to conservation farming is currently being advocated. Among the manifold efforts to facilitate a change towards more sustainable and climate-smart farming practices, conservation farming is the most prominent. Conservation farming aims at improved soil and water conservation combined with reduced dependence on chemical fertilizers, resulting in increased and more stable yields.

### 5.1.5 Findings

Extension services focusing on raising awareness of the importance of soil in the agricultural sector and beyond is necessary. These extension services must be multidisciplinary and touch on all the following aspects and more: Findings of soil science research need to be incorporated into day-to-day understanding based on the following questioning: What are the physical and chemical components of soil that are relevant to enhancing sustainable soil management?

Farmers' awareness of the exact importance of physical soil health beyond favourable crop yields should be heightened, in particular with regard to hunger alleviation, sustainability for future use, and achievement of a number of SDGs.

In all three countries, the discussion on the importance of soil reveals that there is a disconnect between (environmental) science and (environmental) law which needs to be addressed if soil sustainability is to be realised. This will involve using the opportunities and overcoming the numerous challenges pointed out in relation to science, on one hand, and policy and law, on the other. Assessing soil-related risks means that, based on scientific evidence, the likelihood of a certain outcome and its gravity can be estimated, and the resultant knowledge used to formulate policy and decision-making for soil sustainability.

There are opportunities and challenges associated with addressing the science–law interface which offer helpful insights to those involved in this endeavour, especially external scientists not directly involved in government.<sup>43</sup> For instance, there is a need to consider the real-world application of scientific research into soil and how best to transfer this knowledge to decision makers.

In the case of Kenya, the state is mandated by its constitution to promote science and recognise the role of science and indigenous technologies in national development. The state is also exhorted to protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities. This is an important premise upon which to build the law and science interface with respect to the importance of soil. There is a need for data that speak of soil degradation to edify the general public, especially small-scale farmers, and for the involvement of science institutions in model legislation.

In relation to Zambia, the country's constitution makes reference to scientific research within the context of environment and natural resources generally, while the Environmental Management Act has several provisions that encourage the use of scientific research in sustainable environmental management. These provisions, however, do not make specific reference to soil sustainability, while in Cameroon it is noted that there is a need for data that speak of soil degradation to edify the general public,

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43 Moore et al. (2018).

especially small-scale farmers, and for the involvement of science institutions in model legislation.

The fundamental importance of soils in supporting agriculture and forestry is widely recognised, with many examples of the drastic consequences of soil loss. However, in addition to the basic functions of supplying essential nutrients, water, oxygen and support for plants, we now better understand the many other essential services provided by soils in terrestrial ecosystems. Soils are a critical part of the hydrological cycle and can moderate flood risk and contribute to water purification. Moreover, soils contain massive quantities of carbon which, if released into the atmosphere, substantially accelerate the pace of global warming and associated climate change. Fully functional soils support a biodiverse ecosystem, which is essential for the stability of ecosystem functions and to suppress soil-borne diseases, while also providing a potential source of genetic resources. Moreover, although soils are the result of natural processes, these processes are exceedingly slow and – from the perspective of human lifetimes – soils need to be regarded as a non-renewable resource. Some of the scientific processes that affect soil health negatively include erosion, compaction, decline in organic matter content, loss of soil biota, and diffuse contamination. Soils play an important role in achieving half of the United Nations Sustainable Development Goals (SDGs), specifically SDGs 2, 3, 6, 7 and 12–15, which relate to food security, human health, land management including land restoration, water security, climate change and biodiversity preservation.

Intensive farming often leads to the depletion of soil nutrients. Conventional wisdom holds that farmers have a direct interest in maintaining the productivity of their soils (an argument often used politically as to why there is no need for governments to intervene), but the scale of erosion suggests that soil conservation measures are not being properly adopted or implemented.

All the different kinds of practices in crop growing that result in soil degradation need to be monitored. Information and communication technologies should be used in communications and data collection relating to different soil-related agricultural practices across the different ethnic and cultural set ups in the countries and regions of Africa.

### 5.1.6 Recommendations

Generally, it is to be recommended that national governments implement regulations on soil pollution and limit the accumulation of contaminants beyond established levels in order to guarantee human health and well-being, a healthy environment and safe food. The lack of awareness about the significance of soil is an obstacle against achieving sustainable soil management. There is a need to increase awareness and understanding of the profound importance of soil for human life, and to educate the public

about the crucial role soil plays in food security, climate change adaptation and mitigation, essential ecosystem services, poverty alleviation and sustainable development. This can be effected through agricultural legislation which takes into account or addresses the fact, that practices that may compromise or restore soil health and sustainability are well known; standards on good practices are needed to establish clear requirements regarding impacts, monitoring, effectiveness and implementation; while some unsustainable practices such as the use of chemical fertilizers and pesticides and the slash and burn technique are *stricto sensu* illegal in terms of already existing legislation in the three countries. It is recommended that such unsustainable practices should be prohibited first. Secondly, there is a need to establish adequate mechanisms to ensure enforcement of such prohibitions.

The Stockholm and Rotterdam Conventions on the control of pesticides and chemical fertilizers should be implemented in national provisions. Thereby, adequate standards for fertilizers and pesticides could be set. The inclusion of adequate sanctions in legal regulations such as fines or imprisonment is recommended. There is a need for qualitative and quantitative communication on what soil is, and how soil relates to sustainability, crop production and economic development. Lack of communication limits the consideration of the role of soil as an answer to sustainable economic development.

Extension services are an appropriate means of overcoming these kinds of communications challenges. Besides information dissemination, extension services can provide guidance and support in respect of actual physical soil health and agricultural practices.

Information derived from soil research must be made available to the scientific community, soil users (e.g., farmers, agronomists, foresters, civil engineers) and society as a whole. This would ensure that knowledge is transferred and shared with stakeholders, decision makers, land-use planners, politicians and others.

Traditional knowledge could be an important source for setting adequate standards and to ensure respect for cultural perceptions of land. Thus, there is a need to systematically collect and synthesise traditional knowledge in order to preserve cultural heritage and to balance modern and traditional attitudes and approaches.

The soil–science discourse must continue to expand beyond its traditional identification with agriculture as it becomes a partner in the earth, ecological and environmental sciences.<sup>44</sup> Adequate institutional settings are required for law implementation and enforcement. Here the recommendations in the respective country reports should be considered. Continuous monitoring is needed. Soil testing on a regular basis would be one option. As unsustainable practices are often caused by poverty and insecure living conditions, a system of soil stewardship payment or other economic incentives should be considered.

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44 Usman & Kundiri (2016: 66–70).

## 5.2 Agriculture – livestock

### 5.2.1 Summary of three country reports

Livestock keeping is practised in many countries because of the suitability of the climate and the availability of vast grazing lands in Africa. Livestock farming has been a main driver of soil degradation because of the large numbers of cattle that most farmers keep. Overstocking has led to erosion and lack of soil protection, leading to the destruction of important ecosystems.

In Kenya, the Third Millennium Term Plan (2018–2022) notes that low soil fertility is one of the main challenges that agriculture faces. Kenya is the fourth largest livestock farming country in Africa. The rangelands in most pastoral farming regions tend to be stocked with large herds of cattle. The high livestock densities cause soil compaction which renders the environment conducive to soil erosion. In order to avert this mismanagement by pastoral communities, a number of projects have been adopted to improve soil fertility and ensure sustainable livestock farming in the region, such as the National Soil and Water Conservation Project (NSCWP) and a clear definition of grazing rights on community land.

In Cameroon, livestock farming is conducted mainly by using free-range techniques on communally owned lands. This leads to a reduction of quality pastures available for these animals. Cameroon is a leading livestock farming country, according to its report. Livestock farmers keep large numbers of cattle and other ruminants, which trigger burning of more natural vegetation, especially forests, in order to allow for the expansion of grazing areas. Livestock keeping, being a main driver of soil degeneration, leads to a reduction in food production and stocking capacity. In order to curb these problems, the country has established the Ministry of Livestock, Fisheries and Animal Industries to ensure mass tracts of land are established for effective cattle farming.

In Zambia, livestock accounts for about 35% of the national agricultural output. The main concentration areas are the western and southern provinces of the country. The animals kept are mainly goats and cattle, which are run in increasing numbers every year. Owing to this increase, the rural communal lands have become inadequate for animal rearing, thereby increasing their susceptibility to overuse – which results in unsustainable land use. A number of laws have therefore been put in place to ensure that livestock agriculture is regulated, and this ensures the curbing of soil degradation.

### 5.2.2 Public law

There are a number of laws that have been enacted in each country to ensure that livestock farming is regulated. In Kenya, certain activities that degrade the soil have been

prohibited. Section 64 of the Forest Act prohibits practices such as de-pasturing or allowing livestock in any forest areas in order, with the aim of keeping the tree cover at an acceptable percentage. Any person who cuts down trees for livestock purposes will be liable, on conviction, to imprisonment and/or a fine. The Community Land Act provides that grazing rights be consistent with the community grazing routine. Grazing rights may be granted to a non-member subject to the conditions set out by the members. The Physical and Land Use Planning Act does not extensively cover land-use practices nor, owing to population pressure, land predominantly for livestock keeping and farming affected by urbanisation. Large numbers of livestock are seen in urban areas due to inefficient zoning regulations. Deforestation is a serious issue in Kenya and reforestation initiatives are a major focus of the government's forestry policy. This is a vital intervention in the quest for soil health.

In Cameroon, there are a number of policies in respect of livestock keeping regulations. The National Action Plan for the Fight against Desertification (NAP-FAD) identifies a couple of activities that may cause desertification. The objective of the policy is to reduce the effects of the problems associated with livestock farming.

In Zambia, the following practices have been adopted. Section 45 of the Forest Act of 2015 provides that the minister may issue a conservatory order for natural resources on land in open areas to ensure that they are conserved. This includes the manner in which livestock are watered, managed, pastured and moved. This ensures that soil is conserved. Animal health is equally important in ensuring sustainable land practices as provided for in the Animal Health Act. In ensuring soil protection, any other practice on land should be considerate of animal health to prevent the reduction of livestock.

### 5.2.3 Findings

Extension services are crucial in providing important information to farmers and livestock keepers, and especially in encouraging successful adoption of new research findings to ensure effective land use practices in order to conserve the soil.

Kenya generally has a weak extension service system. However, efforts have been made to ensure the protection of the soil. Extension officers offer guidance to livestock farmers on the sustainable use and conservation of soil. The National Policy for the Sustainable Development of Northern Kenya and Other Arid Lands also provides a platform for strengthened research and extension systems for soil conservation. The government has ensured that funds are provided for effective soil protection through the National Environmental Trust Fund. Cameroon, being a member of the African Soil Partnership, has reached a great milestone. One pillar of soil conservation is that it encourages investment, technical cooperation, policy, education, awareness and extension in respect of soil. This ensures that any livestock practices carried out consider the need for physical soil protection.

In Zambia, extension services are important in ensuring that farmers are sensitised to the right way to use land for grazing purposes while protecting soil. Any farmers found in contravention may be liable for criminal and civil prosecution.

In the three countries, farmers can adopt certain appropriate agricultural practices to prevent soil degradation. These may include extensive livestock farming, rotational grazing, agroforestry (which may promote the use of livestock manure as fertilizer), strategic placement of livestock watering points and adherence to judicious stocking rates and carrying capacity. An agricultural area plan may be adopted setting out the areas where grazing may be carried out. With this, soil will be well conserved.

In the three countries, extension officers have been employed to ensure that information is effectively conveyed to the farmers. This information concerns appropriate agricultural practices, soil protection and the different causes of soil degradation. The information also covers the available laws and policies that govern livestock farming. A thorough training may be offered to the farmers in their different regions. The main problem with this is an overlap of roles between the national and county extension officers (in Kenya), which may lead to some not performing their duties or an exchange of roles.

The involvement of researchers is to identify the possible causes of soil degeneration through livestock keeping and to come up with possible solutions, which policy makers then extract and look into as they formulate different policies. This approach ensures that a scientific model is adopted for the planning, implementation and monitoring of land-use practices. A mix of agriculture and pastoralism may be adopted as per the sustainable land management report. This will ensure that greater productivity of the land, reduced soil erosion, improved soil nutrient status and efficient water use are achieved. Grazing pressure management may also be employed. It ensures that the number of livestock that can be accommodated in a given area is assessed in order to protect the vegetation cover, soil and water in a given area. It may also be useful to improve the soil-carbon dynamics protecting the soil structure. The science-policy interface also arises in considering the impacts of the use of chemicals for animal health on soil health.

Kenya has a number of institutions and administrative bodies, from governmental bodies, research organisations, the private sector, non-governmental organisations and local community structures. Communities have the advantage of ensuring administration over grazing lands by determining the activities that are carried out and who is to carry out the activities. This is as per the Community Land Act. This ensures that any livestock activities degrading land are evaded. The involvement of different extension officers also ensures that the livestock practices carried out on land are in accordance with the set-out standards. Involvement of all the institutions ensure that soil is protected, and that livestock increase is regulated. The Agriculture, Fisheries and Food Authorities Act should ensure that it includes the subject of livestock in order to ensure a synchronised soil protection system.

Cameroon has different systems to ensure a smooth system of soil administration in livestock governance. The Ministry of Agriculture and Rural Development oversees the implementation and evaluation of different government policies. This ensures that soil protection is observed in all agricultural spheres, which includes livestock keeping. The Ministry of Livestock, Fisheries and Animal Industries is largely involved in the implementation of policies that look into reducing soil degradation caused by animal husbandry practices. This ensures that soil is conserved. The different extension services also offer a smooth administration of livestock practices which are friendly to the land.

Zambia has different local authorities, local communities, non-governmental organisations and traditional institutions that oversee the need for administration of land-use practices in respect of livestock use. The Minister for Forestry is instrumental in drawing conservatory orders with regard to watering, moving and pasturing livestock. There are a number of skilled personnel with the task of ensuring that the policies are implemented. This ensures that soil is conserved.

#### 5.2.4 Recommendations

Taking the analysis of the three country studies into account, the following recommendations were drawn up: First, environmentally unsound practices should at best be prohibited. In this context, negative effects on forests and effects which may risk increased desertification should be scrutinised. As far as possible, environmentally sound practices with regard to the protection of soils should be determined and approved as legally binding standards. Extension services need to be strengthened in order to better inform and consult to farmers concerning legal standards and acceptable practices. To establish clear incentives, sanctions such as fines and imprisonment should be part of the whole regulatory concept. As provisions are senseless without implementation, an appropriate institutional setting is required. The science–policy interface is important in this context as well. Finally, as settlements such as villages and cities will be subject to sprawl over the next years, a zoning concept needs to be established and enforced in the context of spatial planning on a regional level and for town planning.

## 6 Industry, mining, infrastructure and urbanisation

### 6.1 Industrial facilities

Industry is a potential further driver of soil degradation. The magnitude and the degree of the potentially negative effects depend on the level of industrialisation in a particular country and on the regulatory approach to deal with the effects. Generally speaking,

the level of industrialisation in African countries is low although it needs to be recognised that there are quite big differences. Nevertheless, most African countries strive to accelerate the establishment of additional industrial plants first in order to allow for processing of raw material to increase income by experts, and second and more generally to increase national wealth. Thus, the industrialisation, the potential effects on soils and the appropriate regulatory approaches are important topics with regard to achieving sustainable soil management.

The following sections will provide for the three countries, Cameroon, Kenya and Zambia, a summary of their levels of industrialisation and their current legislation with regard to industrial facilities. Thereafter, options on how to establish an appropriate regulatory regime to ensure sustainable management of soils relating to industrial facilities will be presented. To this end, concepts established in other national legislation will be consulted.

### 6.1.1 The country studies' findings

#### 6.1.1.1 Cameroon

Generally, Cameroon is characterised by a very low level of industrialisation. As such, most of the raw materials extracted from the country undergo very little transformation within the country. The main industrial sites in Cameroon are the coastal industrial region with the Douala zone being the largest industrial concentration. It is important to bring to the fore that as a significant proportion of the industries in Cameroon are not certified with an international environmental management organisation such as the International Organization for Standardization (ISO 140001) series, which states that industries have to internalise their externalities on the environment. Thus, some of the solid and liquid wastes (chemical effluents) are not treated appropriately.<sup>45</sup>

Another soil degradation problem relates to oil and gas exploitation refinery activities by the National Refining Company (SONARA) in Limbe. The government has committed to becoming an emerging economy by 2035, and industrial development has a major role to play in achieving this goal, as outlined in the Vision 2035 and the Growth and Employment Strategy Paper (GESP) that serves as the country's compass for emergence by 2035. Cameroon is also endowed with rich natural resources that will provide industries with raw materials.

At present, there is no specific legislation governing the industrial sector in Cameroon. The sector today is regulated through an array of laws and regulatory instruments governing other sectors such as forests, water and waste management provisions. For a specific industrial activity, such as a petroleum operation, a prior authorisation is

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45 Ekane & Oben (2001); Fogwe et al. (2001).

required under the new Petroleum Code.<sup>46</sup> The operator is obliged “to carry out, at his own expense, an environmental and social impact assessment” pursuant to Article 92 of the Petroleum Code. There is therefore the need to develop a legal instrument that will govern industrial development in Cameroon.

#### 6.1.1.2 Kenya

Kenya is an average industrialised economy serving both local and export markets in sub-Saharan Africa. Although the industries are mainly found in cities and major towns, a sizeable number of industries are found in agriculture-rich areas to cater for the value addition of agricultural produce.<sup>47</sup> Industrial activities produce effluent that is often deposited on soil. Persistent organic pollutants are often found adjacent to industrial facilities. As a consequence, reduction in soil fertility and unbalanced soil nutrition has also been reported frequently.

The current government has identified industrialisation as one of the major focus areas with the hope that industry will create employment opportunities and boost the economy. It thus sees industrialisation as a key development option. The proponent of any project specified in the Second Schedule will undertake a full environmental impact assessment study and submit an environmental impact assessment study report to the authority prior to being issued with any licence by the authority, provided that the authority may direct that the proponent forego the submission of the environmental impact assessment study report in certain cases. In undertaking environmental impact assessments, proponents of projects have automatically been undertaking soil environmental impact assessments.

The public needs to be involved during the assessment of the environmental impacts. For establishment and operation of industrial facilities, a prior authorisation taking into account the results of the environment impact assessment is required. Suitable standards could be determined by the competent authority. The competent authority could impose “environment restoration orders”.

#### 6.1.1.3 Zambia

The manufacturing sector accounted for about 7.8% of the country’s GDP and an average annual growth rate of 3% from 2006 to 2015. The 2005 and 2014 Labour Force Surveys showed that there were 166,143 persons employed in the manufacturing sector in 2005, which increased to 223, 681 in 2014. The manufacturing sector was pivotal in

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46 Article 4 of the Law No. 2019/008 of 25 April 2019: Establishing the Petroleum Code.

47 Government of Kenya, The Presidency (2017).

economic development as it played a key role in the backward and forward linkages to economic growth. Zambia has a National Industrial Policy which took effect in March 2018 and recognises the vast natural resources wealth of the country. The vision of the country is to be an industrialised and competitive nation with a diversified, innovative and globally competitive industrial base which contributes to sustainable growth and employment creation by 2027.<sup>48</sup>

The National Industrial Policy is motivated by the aspirations of the Country's Vision 2030 which aims at transforming Zambia into a prosperous middle-income economy. The policy identifies nine specific objectives, one of which is central to sustainable soil management: to promote environmentally sustainable industrial production through the adoption of cleaner technologies; promotion of environmental certification; streamlining environmental impact assessment procedures; promoting compliance to environment management regulations by enterprises; and promoting capacity-building and awareness in industries to enhance environmental protection.

Pursuant to Article 29 and 26 of the *Zambian Environmental Management Act*, projects that may have an effect on the environment require a written approval by the competent agency. For all industrial facilities which potentially discharge contaminants, an environmental impact assessment is required. The law furthermore requires the establishment of a strong inspectorate system.

### 6.1.2 Recommendations

In order to determine the potential options for good soil governance with regard to industrial facilities, it is necessary to elucidate the major soil threats involved with industrial activities. Industrial facilities may primarily cause contamination via the emission of hazardous substances via air, water or other means. In addition, physical soil threats like compaction may be caused by the establishment and operation of industrial facilities. The establishment of industrial facilities may also give rise to detrimental effects on particularly valuable compartments of soil – taking into account the particular fertility of soils, a high level of soil carbon or of biodiversity – e.g. swamps or other compartments. The three country studies have documented that, first, there are already many industrial facilities and that, second, all three countries intend to promote industrialisation of their economies.

It could be recommended that a regulatory regime should first address soil degradation, in particular by contaminants, which has already been caused by existing facilities, and, second, should avoid future negative effects by both existing and new facilities. In order to set clear requirements with regard to contamination, soil quality standards for the most crucial parameters such as lead, cadmium, mercury, benzopyrene and

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48 Mulimbika & Mahbub Karim (2018).

others should be adopted. The soil quality standards should be conceptualised as maximum tolerable concentrations in the soils in order to ensure that the ecological functions of soils are maintained. The standards could be adopted by subordinated legal instruments such as ordinances. Experience clearly documents that standards are much more effective if they are legally binding.

In case of already existing contamination, the regulatory regime should require the restoration of the contaminated area. Usually, the operator should be held responsible and should bear the costs of the rehabilitation measures according to the 'polluter pays' principle. The above-mentioned standards are of eminent importance as they determine generally the required level of restoration. Furthermore, the future use of a specific spot should be taken into account owing to the potential negative effects on human health. A site which is to be used for food production or for the establishment of a kindergarten requires a higher soil quality than a future industrial installation.

In addition, a soil restoration fund to which all operators of industrial installations should contribute financially seems to be a reasonable proposition. In cases where the operator responsible for the restoration is insolvent or cannot be identified or has left the country, the restoration measures can be financed by the resources available in the soil restoration fund. Alternatively, or even additionally, the obligation of operators to submit securities may be advisable.

In order to avoid or at least reduce future soil contamination by industrial facilities, it is essential to establish a regulatory regime that such a facility must not be established or operated without prior written authorisation – which is the case in Cameroon (only for petroleum activities), Kenya and Zambia. Such a regime should be clear, ambitious and participatory. For the sake of clarity, it is recommended that the categories of industrial installations for which an authorisation is required should be listed in a subordinated legal instrument such as an ordinance. Such a list which could determine the relevant industrial activities which may cause negative effects for the environment, and thus, for soils too, would be extremely helpful for the competent authorities and would help to improve law implementation and enforcement. From the perspective of operators, it would be very instructive and would ensure clarity.

An environmental impact assessment, including an environmental impact study, should be used as baseline to decide whether an industrial activity can be permitted or not. In this context again, the above-mentioned standards for soil quality are of eminent importance. Taking these standards into account, the competent authority is in a position to decide whether the emissions to be expected from an industrial facility are acceptable or not.

The environmental impact assessment (EIA) should be conducted by the operator and at his or her expense, as in most African states governmental institutions lack financial resources. It could be assumed that foreign investors, in particular, are usually able to bear these costs.

General public and civil society organisations should be involved in the permission procedure. They need to be invited to comment on the plans of the operator and, in particular, on the environmental impact study. Their comments should be taken into account by the competent authority. A new industrial facility is an important issue in most African countries; thus, society needs to be involved in the decision-making.

Furthermore, the operator should be committed to monitoring continually whether the requirements which have been included in the authorisation are complied with. The monitoring should be at the expense of the operators. The competent authorities should be empowered to control the industrial activities in order to check whether they are in line with the legal requirements and, if necessary, to enforce measures in case of non-compliance.

In addition, a regulatory instrument could be established which clearly sets an economic incentive for the operators of new industrial installations to avoid negative effects on soils. In order to maintain soil functions, the operator could be required – before production starts – to examine and document the status of soils beneath the industrial site in a so-called ‘baseline report’. The baseline report should be part of the documents required for the application for a prior written authorisation. Furthermore, it should be regulated that after the closure of the site, the operator has to rehabilitate the site to the original status of the soil and groundwater, if significant negative effects have been caused.

This regulatory concept was first adopted by the Industrial Emissions Directive of the European Union in 2010. The combination of the baseline report and the obligation to rehabilitate the site to its original status, create an incentive to avoid negative effects on soils. It seems to be important that the public is involved in the decision-making process after the closure of the site in order to ensure a regular pattern of behaviour of the authorities in charge.

This conceptual approach is probably only applicable in cases where the soil threat is relatively limited in terms of spatial extension. It cannot be applied in cases of diffuse sources or very large areas, e.g., agriculturally used plots, as the assessment and documentation of the status of larger parts of soil compartments would simply be too time-, resource- and cost-consuming. With regard to the protection of particularly valuable soil compartments, planning instruments seem to be necessary. Competent administrative bodies should be empowered to determine areas which should be excluded from industrial uses and potentially also to determine go-areas for industrial facilities. Thereby, it could be ensured that particularly valuable soil compartments could be protected.

## 6.2 Mining

Mining has had a major impact on soil, water and biota since ancient times,<sup>49</sup> and documented examples from around the world abound of heavily contaminated soils associated with mining activities.<sup>50</sup> The mining process includes metal smelting to separate minerals – which introduces many pollutants into the soil through the release of huge quantities of heavy metals and other toxic elements into the environment which persist for long periods, and can be dispersed by wind and water erosion over long distances to eventually reach agricultural soils. For example, high levels of lead and copper have been found in agricultural fields located near a tailings dam in Namibia<sup>51</sup> and toxic concentrations occurred in agricultural soils and crops in India, resulting in a high risk to human and livestock health.<sup>52</sup> This situation is similar to the general outlook in Cameroon, Kenya and Zambia. Moreover, mining leads to the removal of topsoil and to the use of wide plots on the surface which could be used for other purposes. From a practical point of view, after closure, mining areas should be rehabilitated to a good environmental status.

### 6.2.1 The country studies' findings

#### 6.2.1.1 Cameroon

Cameroon is richly endowed with vast mineral deposits which facilitate the ongoing large-scale mining in the country. The country has huge mining potential, as exploration studies have shown a wide range of sub-surface precious minerals. As noted in the opening remarks to this section, mining presents numerous adverse effects on soil quality, owing to toxic chemicals and acidic water which are released into the environment during and long after mining processes. These changes affect the chemical composition of the soil and the high toxicity of chemicals makes the soils unsuitable for plants to thrive. Furthermore, mining alters the flow of nitrogen through a stable soil-plant-microbial ecosystem. Most of the mining companies in Cameroon exploit the mineral resources with impunity and do not take into consideration the protection of the environment. The environmental status in these areas have been reported to be negative with serious implications for soil degradation since the wastes generated are not treated before disposal.

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49 FAO & ITPS (2015).

50 Alloway (2013).

51 Mileusnić et al. (2014).

52 Kumar & Maiti (2015).

Cameroon is one of Africa's most attractive new mining destinations for international investors. In this respect, the government has developed a Minerals Policy to ensure the continual development of the mining industry in the quest to diversify the economy and harness the natural resources for the development of the country. Mining operations take place in the natural environment with serious threats to soil quality. Although legislation governing mining activities in Cameroon addresses environmental problems such as soil degradation and provides for soil protection, it also contains some weaknesses that incentivise soil degradation.

Mining law regulates the search for, discovery, exploitation, detention, transportation, transformation and commercialisation of mineral substances. The role of foreign investors in mining in Cameroon is significant; local Cameroonians do not possess the technical equipment and the necessary technology for mineral exploration and exploitation. Consequently, the country always solicits the intervention of foreign investors. These investors have to comply with the regulations in force relating to their line of activity. Unfortunately, these foreign investors are not usually preoccupied with the responsibilities of environmental protection. It has been noticed that investors are usually in no hurry to obtain environmental authorisations before launching their activities. This is why, once a site has been exploited, the investors care little about reinstating or rehabilitating the exploited site. These dilapidated sites constitute a threat to the host populations and lead to soil degradation. In addition, both foreign and local investors use chemical products that are unhealthy for humans and the environment, such as mercury which is used illegally on sites. Therefore, the responsibility for environmental degradation, notably soil degradation, is shared between the state and the other stakeholders, who are both explorers and exploiters.

#### 6.2.1.2 Kenya

Kenya is a mineral rich country with huge deposits of fluorspar, gold, soda ash, coal and titanium in coastal areas. Other known minerals include manganese, iron ore, gypsum, diatomite, chromite, limestone, and silica sand. In anticipation of the discovery of new minerals and oil deposits, the country adopted its first-ever Mining Policy in 2016 to enable the country to reap maximum benefits in future. As already noted, mining and related activities are responsible for loss of biological diversity, increased soil erosion, contamination of soil due to huge deposits of chemicals used in excavation and mining, and contamination of surface and groundwater.

Although the EMCA provides for environmental protection, its enforcement and observance are not as effective as would be expected. For instance, it is a requirement that an environmental impact assessment (EIA) should be carried out before embarking on any project likely to have a negative impact on the environment. In many cases, no such assessments are carried out in the extractive industry and, if carried out, they

do not meet the legal threshold. For instance, in *Cortec Mining Kenya Limited v Cabinet Secretary Ministry of Mining & 9 Others*, a titanium extraction licence was cancelled on the grounds that an EIA had not been carried out despite mining having started. The establishment of the Lamu Coal Plant at the Kenyan coast was also halted by the National Environmental Tribunal in *Save Lamu & 5 Others v National Environmental Management Authority (NEMA) & Another* for, among other reasons, failure to carry out an EIA to the required legal standards. These cases illustrate how environmental laws that could protect and conserve the environment, including soil, are disregarded.

The law lays down requirements for site restoration and mine-closure plans. The Cabinet Secretary will not grant a prospecting licence, a retention licence or a mining licence to an applicant, unless the applicant has submitted site mitigation and rehabilitation, or mine-closure plans for approval. The Cabinet Secretary may prescribe regulations for site rehabilitation and mine-closure obligations, which are relevant to soil sustainability. The law also provides for Environmental Protection Bonds.

It is important to note that most of the mining operations in Kenya are small-scale, artisanal and informal, and, as such, the majority do not obtain mining licences. For instance, the artisanal gold mining areas of western Kenya have reported high soil pollution as miners continue to use metals illegally, such as mercury and lead in gold prospecting. Therefore, the environmental impacts arising from this can be unmitigated and, in mining, soil is the most compromised natural resource.

### 6.2.1.3 Zambia

Mining plays an important economic role in Zambia through employment creation, revenue generation and rural urban development, among others. With little success, the country has continued to make efforts to reduce copper dependence and support the diversification of the economy to other minerals, such as gemstones and other minerals outside of mining. Despite the enormous economic benefits associated with mining activities, there are a number of negative impacts. Additionally, quarrying is increasing as a result of heightened demand for aggregate materials for use in the booming construction industry. Although quarrying has brought socioeconomic benefits, especially for the informal sector, it is usually uncontrolled and illegal, particularly in urban areas. Rising negative environmental impacts include land degradation, groundwater quality deterioration, soil contamination, air and surface and groundwater pollution, formation of sinkholes and erosion. Other notable environmental impacts include deforestation, loss of biodiversity and formation of acid rain.

The Mines and Minerals Development Act, No. 11 of 2015 (MMDA) is the main legislation governing mining in Zambia, read together with the Mines and Minerals Development (Amendment) Act, No. 14 of 2016. The MMDA establishes the Mining

Licensing Committee which considers applications for mining rights and non-mining rights, and the grant, renewal and refusal of mining rights and non-mining rights in Zambia. The committee is also responsible for terminating, suspending and cancelling mining rights and non-mining rights, amending terms and conditions of mining rights and non-mining rights, and advising the Minister on matters relating to its functions under the MMDA. These outlined functions do not specifically point out that soil sustainability matters are at the forefront of the conditions to consider before granting or varying a mining right. Given the nature of mining activities, however, it is argued that failure to implement measures aimed at securing soil sustainability must be explicitly stated as a condition for denying mining rights.

Further, the MMDA prohibits exploration, mining or mineral processing without a licence or environmental impact assessment granted by the Zambia Environmental Management Agency (ZEMA). Furthermore, the MMDA mandates the committee to take the following into consideration: the need to conserve and protect the air, water, soil, flora, fauna, fish, fisheries and scenic attractions; the features of cultural, architectural, archaeological, historical and geological interests; and the need to ensure that any mining or mineral processing activity prevents any adverse socioeconomic impact or harm to human health, in or on the land over which the right or licence is sought. While some of the provisions are quite unspecific and leave room for interpretation which could stand in the way of an effective implementation, the provisions of the MMDA are, overall, progressive and would be effective in sustainable soil management and environmental protection.

## 6.2.2 Recommendations

The challenges with regard to the implementation of environmentally sound mining are diverse. First of all, mining activities by foreign investors need to be treated differently from national enterprises and small-scale mining. With regard to mining operations by foreign investors, the recommendations about tenure rights and control of foreign investors have to be considered and applied. More generally, further recommendations could be made. All recommendations which have been submitted with regard to industrial installations are equally valid for mining operations, such as the restoration obligation for already occurred soil contamination; the requirement of a written prior authorisation based on an environmental impact assessment and involving the public; and the establishment of effective monitoring.

It is important that the maintenance of soil quality is established as one assessment criterion for granting permission, either via an environmental impact assessment or as a single legal requirement. Law enforcement seems to be a specific challenge. A specific challenge is the regulation and control of small-scale mining. It is hardly possible to allocate sufficient resources so that the effective enforcement of 'good provisions'

is doable and small-scale mining becomes well controlled. Three measures seem to be more promising: First, security of land tenure could avoid wild and uncontrolled mining as people would be certain about their possession and this would hinder negative effects on their property. Secondly, awareness-raising might offer a chance that people would look for other opportunities to make their living. Thirdly, if the carrot does not provide sufficient incentive, the stick might work. In other words, severe penalties in case of law infringements around mining operations may create a public perception that illegal small-scale mining is risky and thus less attractive owing to probable penalties.

Functioning land administration systems play a vital role in providing land tenure security. Outdated, non-transparent and overlapping land tenure laws can weaken community property rights and foster corruption. Understanding the complexity of African land tenure systems can also harness the increase in large-scale land acquisitions, often also referred to as land-grabbing in various African countries.

## 6.3 Infrastructure

### 6.3.1 The country studies' findings

In Zambia the infrastructure such as roads and communication facilities are underdeveloped. This is mostly in the rural areas. Lusaka plays a significant role in regional air transportation. There are poor network facilities in most of the rural areas. The main mode of transport is via road, and most of the roads are not well developed. The use of roads seems to affect soil structure and quality owing to compaction. The railways built in Zambia mainly serve the needs of the mining sector. The Ministry of Housing and Infrastructure Development manages Zambian infrastructure. Some of the challenges facing the infrastructure system in Zambia are the over-investment in road networks, which then affect soil use, and the subsequent neglect of these rural networks. The railways attract low traffic volumes, and the Lusaka airline connectivity is declining owing to competition from other counties such as Kenya and Tanzania. In addition, access to electricity is only at 20% in Zambia. This therefore lags behind the utilisation of soil and also development in the rural areas.<sup>53</sup>

In Kenya, as in Zambia, the main form of infrastructure is roads. The rate of infrastructural development in Kenya is a bit more moderate than in other countries such as Zambia and Cameroon. The state of roads is not too bad, and the road transport network covers a larger area in the country. Energy production is also good in Kenya, and power is supplemented by neighbouring countries. Railway transport is being improved and Kenya now has a standard gage railway. Air transport is well-developed,

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53 Foster & Dominguez (2011).

and Kenya Airways is one of the most developed airline companies in the region. Internet connectivity is faster in the urban areas and internet accessibility is fair across the country.

Some of the challenges that affect the Kenyan infrastructure are the poor drainage system, adverse weather conditions, and poor management. Roads management also faces challenges of governance between the county government and the national government. The managing body that regulates infrastructure in Kenya is the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works.

In Cameroon roads are the main form of transport infrastructure. Cameroon also makes use of a relatively high performance CAMRAIL. CAMRAIL is one of the most intensely used transport networks in sub-Saharan Africa. Cameroon further has port services similar to those of Kenya, and the country is a natural air-traffic hub for central Africa, as demonstrated by relatively high traffic levels.

The summary outcome of the three countries concludes that their main transport network is road. Other forms of infrastructure such as buildings and internet accessibility experience various challenges, which are relatively similar. Negative effects on soils are mainly caused by degradation of valuable soil compartments through sealing, compaction and contamination. The challenges are comparable to those of mining and industrial installation, both from the perspective of environmental protection and from the fact that foreign investors are often involved in constructing infrastructure such as roads.

### 6.3.2 Recommendations

First of all, it is recommended that the measures suggested to control foreign investors need to be implemented. Furthermore, the recommendations with respect to industrial installations should also apply for better protection of soils threatened by the construction of infrastructure. The effective protection of soil quality needs to be a crucial criterion, either through an environmental impact assessment or as one of the legal requirements of a permission procedure. Along with these governance-related recommendations, it seems to be advisable that African governments consider investing in other forms of transport, such as railways to reduce CO<sub>2</sub> emissions and potentially negative effects on soils. Finally, increased internet connectivity is important to develop a basis for gathering, and to synthesise and publish data on soil quality and status. Through internet, awareness can also be increased.

## 6.4 Urbanisation

Africa is an exceptionally biodiversity-rich continent which is urbanising rapidly, to the detriment of its natural resources. Currently, the continent has “seven megacities, that is cities with populations over 10 million: Cairo, Kinshasa, Lagos, Accra, Johannesburg–Pretoria, Khartoum, and Nairobi. In 15 years, Luanda and Dar es Salaam will be added to this list.”<sup>54</sup> Although urbanisation is a necessary condition for modernisation, there is an increasing need to account for its direct and indirect impacts on the continent. With soil being the lifeline of biological diversity and ecosystem services, it is clear that there is an urgent need for sustainable urbanisation in Africa.

The high levels of urbanisation in Africa have led to the development of slums, in which high poverty levels; poor air, soil and water quality; insufficient water availability; waste-disposal problems; and diseases manifest themselves.<sup>55</sup> This generally contributes to greater demand for land for commercial use, social and economic support institutions, transportation, and residential developments – with the consequence of rapid environmental degradation. Eventually, these activities put pressure on sustainable soil management. Urban expansion that takes place in forests, wetlands and agricultural systems leads to habitat clearing, degradation and fragmentation of landscapes. Urban lifestyles are largely consumptive, requiring vast quantities of natural resources and generating increasing amounts of waste, and also lead to increased levels of air, water, and soil pollution. As the global urban population increases, so does the generation of waste. In both developing and least developed countries, high rates of population growth and increasing waste and sludge production, combined with lack of municipal services to deal with waste management, create a dangerous situation in many ways, and particularly as a breeding ground for diseases that are also likely to contaminate soils.

### 6.4.1 The country studies’ findings

Poor urbanisation and industrialisation processes are singled out as not auguring well for environmental protection and soil restoration in Cameroon. The consequential pressure to discharge significant volumes of effluent and other wastes leaves soil health out of the equation, owing to weak enforcement of environmental laws, institutional lapses, and corruption. In addition, poor planning is one of the major reasons for soil contamination. For instance, in Douala, industries are located on a more elevated terrain while the human population is concentrated downstream. The ensuing challenge of managing liquid waste becomes difficult and culminates in a negative impact

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54 Güneralp et al. (2017).

55 Koop & van Leeuwen (2017: 387).

on public health and sustainable soil management. In theory, urban and spatial planning laws and policies in Cameroon guarantee sustainable management of natural resources – the environment and soil resources in particular. Such planning laws and policies ought to help direct certain activities away from ecosystems that need special protection.

Rapid urbanisation is among several drivers of soil degradation in Kenya, just like in the other two African countries. Urbanisation contributes to degradation of agricultural soils – which in turn threatens food security. In summary, the ensuing pressure on natural resources and the wider environment weakens soil sustainability. In addition, Kenyan planning laws have historically not kept up with the needed effective planning and management of urbanisation processes through provision of adequate and decent housing, sanitation and infrastructure. In this regard, the law did not have effective regulatory mechanisms to deal with rapid urbanisation, population pressure and emergent land.

Zambia is one of the most urbanised sub-Saharan African countries, with 42.1% of its population living in urban areas. The country has a characteristic linear population growth along railway lines, where most urban centres are located. Urban residents generally have relatively better access to public services and infrastructure compared to their rural counterparts and experience greater development, resulting in clear distinctions in human settlements between urban and rural areas and between different regions of the country. The ensuing high levels of urbanisation place immense pressure on the government to find land for new settlements, and at times at the expense of land designated for ecological preservation, such as forests, protected areas and other ecologically sensitive hotspots. Further, high levels of urbanisation influence a number of other activities which have a negative impact on the physical properties and pollution levels in soil. For instance, water scarcity is already a major problem for the world's poor, independent of the effects of climate change – which is projected to further reduce water availability in many water-scarce regions, particularly the subtropics. Meanwhile, water availability is a significant factor in maintaining soil sustainability, and close to two million more Africans are expected to find themselves without adequate clean water in the near future, as a result of unsustainable urbanisation. This will most likely lead to an increase in poverty and pandemics, such as malaria and cholera. These public health concerns will put further pressure on natural resources such as water and soil.

#### 6.4.2 Recommendations

In order to manage the effects of urbanisation processes in African states, routine, well-coordinated town mapping needs to be put in place. To come up with effective town

planning, the required information on natural resources (soil) and human population needs to be available and to be taken into account.

Legal instruments such as mandatory town planning can only be effective if they are applied reasonably with a long-term development perspective, if sufficient information is available in order to justify decisions, and if the town planning is accepted as stirring for the subsequent authorisation of buildings and infrastructure. In addition, it should be obligatory to base town planning decisions on environmental impact assessments which necessarily include soil quality.

To achieve sustainable soil management, enhanced digital soil mapping tools could provide a cost-effective means of determining soil geographical distributions.

## 7 Clarity of land tenure

### 7.1 The country studies findings

Land tenure types and policies strongly influence land-use practices and hence affect the quality of soils in Africa. Land tenure in Africa – both statutory and customary – is characterised by insecurity, constituting a potential underlying driver of soil degradation in general and specifically in Cameroon, Kenya and Zambia. There are different kinds of land tenure types giving rise to conflict and unsustainable land and soil management in these countries, which may arguably be a reflection of what obtains on the entire continent. For instance, there is ample evidence where customary rules prescribe acceptable claims to land among members of communities, but such claims are contradicted or nullified by national legislation. Communally ‘owned’ lands, in particular in Cameroon and Zambia, are insecure. Consequently, such lands are easily converted into national lands for development purposes. This conflict between the land tenure systems, both statutory and customary, leads to rising land tenure conflicts.

One reason for the insecurity of owned land is the high economic value presently placed on land and its appurtenant resources. This has invariably increased the tendency of the most powerful to engage in land grabbing and dispossession in Africa. This is to the detriment of the vulnerable groups that are increasingly being displaced from their lands, which triggers disputes and conflicts. In fact, customary land tenure systems offer weak security, and the modern land law provides huge opportunities for land grabbing. For instance, there is a law in Cameroon which enables the state to obtain possession of any piece of land regardless of who the owner is. This law thus not only completely ignores traditional undocumented systems of land ownership, but it is also questionable in terms of the rules of legitimate expropriation. Land titles and leases are the only legal means of claiming property rights to land. Even though it is generally known that the tenure rights of the land of local communities were

established long before the state came into existence, most lands are classified as national and state-owned despite century-old claims by communities.

In addition, all three countries have weak governments and a problem with corruption. All three countries' soil management systems are linked to corruption, which contributes to the inefficiency of the law. Especially in Cameroon, land register registration processes are therefore often incorrect. Sometimes, for instance, more than one land title is given for the same property, which leads to conflict. The generosity of land tenure legislation in Africa to the most powerful leads to the insecurity of owned land.

The various pieces of land legislation in Cameroon and Zambia are completely devoid of soil protection provisions. This means, in particular, that the land tenure systems of Cameroon and Zambia are silent regarding the question of the environmental landowners' and users' responsibilities. Reading through the segregated and dispersed pieces of national legislation on land, one does not find much expressed or implied that refers to the need to protect soil. Thus, land law in some countries is not only incoherent in terms of two systems co-existing and governed by segregated and ambiguous pieces of legislation, but it is also equally incomplete as it fails to address the need to protect soils.

These drawbacks in the land laws are not infrequently a legacy of colonial history, which has been reinforced by the modern post-colonial administration with the objective of exerting supremacy over vulnerable communities and for economic interests without due consideration of the need to protect the environment. Colonisation has influenced and encouraged the following drawbacks: the non-legalisation of customary land holding; the fact that the state owns most of the land; and the practice of land grabbing and dispossession of local communities' land by the state and its powerful allies; the challenges of land access and rights; and the high costs and cumbersome procedures involved with obtaining land titles. All of these factors have serious implications for soil degradation.

In contrast to Cameroon and Zambia, Kenya to a large extent has a rich land law with socioeconomic and ecological aspects that decisively support sustainable soil management and protection. In terms of ownership and rights over land, in particular, Kenya's land law seems exemplary. Land law takes into account aspects of conservation, environment and cultural heritage that are relevant to soil protection when developing, cultivating or using public land. This includes, for example, the conservation and management of land-based natural resources and makes provisions for grazing rights (overgrazing is one of the causes of soil degradation on rangelands on the continent). Environmental impacts have to be taken into account in the development, management and use of the land, according to the applicable environmental laws. Furthermore, the Community Land Act empowers registered communities to make rules or by-laws for regulating the management and administration of their land. These rules may provide for the regulation of investments into the land; the determination of terms

for any leases granted for purposes of investment; the conservation and rehabilitation of the land; land use and physical planning; and any other relevant matter.

Despite the environmental considerations of land use guaranteed by the Kenyan land tenure system, the various pieces of statute have not yet been effective in the management of land and, by extension, have not enhanced the protection of soil in Kenya.

Corruption, political patronage, weak institutions, and ineffective development control institutions have also affected land-use planning and therefore poor soil management. In addition, the legislature's planning laws were too slow to respond to dynamic development to cope with rapid urbanisation, population pressures, and emerging rural development. This has led to indiscriminate extension of urban boundaries in areas of land, which are still used predominantly for farming and livestock keeping. Land use in Kenya's urban areas does not conform to existing zoning and building regulations. Agricultural lands have rapidly been converted into concrete jungles and industries have sprung up in areas zoned for agriculture.

The 2019 Physical and Land Use Planning Act has addressed some of these issues. Effective implementation of the Act will contribute to sustainable soil management. Of concern, however, is the failure of the Act to address the duplication and parallel setting up of institutions in the county government and national government. This is likely to continue to affect sustainable soil governance, because there is no guaranteed vertical and horizontal institutional coordination. Such coordination would bring the administration closer to the population and lead to effective public participation in decision-making.

## 7.2 Recommendations

With the exception of Kenya, one does not find a strong anchor point for soil protection when perusing the countries' legislation on land tenure. None of the scattered pieces of related legislation in Cameroon and Zambia make any direct or implicit reference to the need to protect soils. Also, despite Kenya's rich land law that lends support to sustainable soil management and protection, the various statutes have not been effective in the management of land and, by extension, have not enhanced the protection of soil in Kenya.

The main challenges of poor planning, corruption, political patronage, weak institutions and institutional conflicts have been largely disregarded. It is these shortcomings that prompted the following recommendations: It is recommended to reduce the multiplicity of legal instruments and requirements on access to land by means of harmonisation and consolidation of the fragmented and dispersed pieces of legislation on land tenure in a single and comprehensive overarching land act. Moreover it may be advisable to formulate new legislation in such a way that it recognises customary

laws relating to land tenure or, at least, so that it ensures that procedures for access to land are comprehensible and accessible to all social groups. Preferably, land acts that harmonise and consolidate the fragmented and scattered pieces of legislation on land tenure should be enacted in these countries and customary and statutory land tenure should be given equal status. Alternatively, such land acts should recognise and accord legal protection to customary land rights and consider such rights as a category of private property existing alongside national lands and state-owned lands. This may be accommodated within ongoing land tenure reform processes.

It is important to mainstream the responsibility to protect the environment, especially soils, in the harmonised and consolidated legislation on land tenure. Therefore appropriate and clear vertical and horizontal institutional arrangements need to be crafted that make for a win-win situation in order to curb or completely put an end to institutional conflicts, as these are negative precursors to sustainable soil management initiatives. This needs to be complemented by means of enhanced measures to fight corruption and to build institutional capacity in land administration matters.

## 8 Control of foreign investors

Foreign investors constitute one of the main groups of actors responsible for soil degradation in many African countries such as Cameroon, Kenya and Zambia, necessitating their effective control. The increased role of foreign investors across many economic activities in these countries can possibly lead to downward spiralling effects in land and soil degradation. Their role as main actors of soil degradation in these countries is much felt in the mining and agricultural sectors. Therefore, foreign investors constitute some of the actors to be considered in the process of developing model legislation for soil protection in these countries and the whole of Africa. The role of foreign investors in the mining sector is significant.

Cameroon, in particular, is endowed with huge deposits of liquid, solid and gaseous minerals that have attracted a handful of foreign investors. In the same vein, Kenya and Zambia are endowed with hard minerals that have in equal measure attracted foreign investors to the mining sector. All three countries have extensive fertile lands that favour large-scale agriculture.

In fact, Africa is considered today as the new preferred destination for agricultural investments, but this brings serious environmental impacts such as deforestation and soil destruction. It is quite unfortunate that foreign investors are often not preoccupied with the concerns of environmental protection. Not only that they are usually in a mad rush to launch their activities before obtaining environmental authorisations, and once they have exploited mining sites, the investors care little about reinstating or rehabilitating the exploited sites. These neglected sites lead to soil degradation. Foreign

investors are also involved in the illegal use of chemical products such as mercury in the mining sector and fertilizers and pesticides in the agricultural sector, which are unhealthy for the environment, polluting water bodies used by communities and destroying soils and attendant biodiversity.

## 8.1 The country studies' findings

### 8.1.1 Cameroon

Regarding the control of foreign investors, especially as far as compliance with public law is concerned, the institutional dispositions of Cameroon give every public administration operating within their respective areas of competence the power to control and monitor all investments and investors, including foreign investors. For instance, the administration in charge of hydrocarbons ensures the respect of the regulation in force in that sector such that every investor must conform to the provisions of the petroleum code. This equally applies to soil and subsoil wherein the administration in charge of water makes sure that investors in this domain respect the provisions of the water regulation in force. The administration in charge of mines ensures that investors comply with the provisions of the regulation in force in this sector. This same principle applies in the domains of agriculture, forestry and environmental protection. Despite the power given to each administration to ensure the respect of the regulations of the different sectors by investors, it is common to see clandestine operators who do not carry out their activities in conformity with the regulation in force or who do not comply with legal texts in the respective sectors. This situation may be due to the deplorable and corrupt attitudes of some administrative authorities charged with the responsibility to oversee these situations. These are some of the situations that cause environment degradation in general and the degradation of soils in particular. For instance, once these clandestine operators exploit a given site, they usually abandon it without reinstating or rehabilitating it.

The Law on private investment<sup>56</sup> in Cameroon treats all foreign investors equally irrespective of their countries of origin. This law makes reference to an organ<sup>57</sup> that provides information to any foreign investor with respect to his or her type of activity.

Regarding the acquisition of land for investment, the land tenure laws of the three countries give equal access to both nationals and foreigners. All applicants are required

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56 Law No. 2017 / 015 of July 12, 2017 to modify and complete some of the provisions of Law No. 2013 / 004 of April 18, 2013 on the encouragement of private investment in the Republic of Cameroon.

57 The Cameroon National Investment Corporation.

to consult with communities occupying or harbouring a parcel of land which is an object of acquisition.

In Cameroon, for instance, Ordinance No. 47/01 of 6 July 1974 to establish the land tenure regime in Article 10 provides the following: Natural persons and corporate bodies of foreign nationality or incorporations wishing to invest in Cameroon may conclude lease agreements or purchase landed property except in the border areas. Deeds drawn up for this purpose will bear the prior approval of the minister in charge of lands, under penalty of being declared null and void. The visa of the minister of external relations and the minister in charge of lands is required when diplomatic and consular missions as well as international organisations seek to acquire land in Cameroon. In the event of resale, the state always has a pre-emptive right of purchase over the property, taking account of the initial price, developments carried out and amortisation.

The Cameroon Mining Code<sup>58</sup> equally provides in Article 106 that upon the signing of the mining agreement, the state, after consultation with the affected populations, can grant to the mining operator the lands necessary for the mining of the discovered mineral substances, in accordance with the laws and regulations in force. However, practices do not always match legal prescriptions as there are usually some unfair or illegal land dealings in which, in collusion with the government, foreign investors enter into possession of lands and mining concessions without complying with legislation requiring “free prior and informed consent” (FPIC) from affected or concerned communities. Such practices have been known to degrade the environment in general and soils in particular.

The taxation system in Cameroon is fair towards foreign investors who are subjected to the general tax regime in the same way as national investors. There is a sole tax code that applies to all investors – both national and foreign – in a uniform manner. For each budgetary year, the draft finance bill, which contains the tax provisions/column to be levied on all investments, is prepared by a single authority – the Ministry of Finance and voted into law as the Finance Law by Parliament. According to Law No. 2018/012 of 11 July 2018 relating to the financial regime of the state and other public entities, the domain of taxation is regulated by a single administration in Cameroon which is the Ministry of Finance. In effect, even though it is provided in many legal texts, the tax provisions of these texts are elaborated upon by the ministry in charge of finance, otherwise all the other ministries will have to seek the opinion of the said ministry regarding the financial provisions to be inserted in any legal document. It is these two texts that determine the financial gains expected to be paid into the public treasury and in all sectors of activity. It should however not be that some legal instruments grant tax exemption for a certain period and tax reduction to

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58 Law No. 2016/017 of 14 December 2016 repealing Law No. 001 of 16 April 2001 establishing the Mining Code and its modification by Law No. 2010/011 of 29 July 2010.

both national and foreign investors exercising in specific domains or exporting their products, etc.

### 8.1.2 Kenya

Kenya has enjoyed a steadily improving environment for foreign direct investment (FDI). Yet, corporate social responsibility (CSR) efforts in applying international standards relating to human rights, business ethics, environmental policies, community development, and corporate governance can still be improved.<sup>59</sup> Moreover, Kenya needs to address internal challenges, repurpose its infrastructural projects, and focus on wider regional integration to address the rising competition. For a long time, Kenya was the largest and most dominant economy in eastern Africa in terms of gross domestic product and socioeconomic development in the areas of poverty alleviation, literacy, healthcare, income, civil liberties and freedoms, infrastructure, and industry, among others. However, Rwanda and Ethiopia have recently been chipping away at Kenya's dominance. Of particular concern for the country is the need to address corruption and taxation schemes, which have increased the cost of doing business and reduced foreign investment attractiveness.

### 8.1.3 Zambia

The current legal and institutional framework concerning foreign investors in Zambia comprises the Constitution, applicable sectoral and tax legislation, the Zambia Development Agency Act, Companies and Business Regulatory Acts, and all other allied policies and institutions created thereunder. Foreign investment in Zambia is heavily reliant on land use and natural resource capital. Most of the targeted investment opportunities in Zambia are in key economic sectors, namely energy, forestry, mining and agriculture. As these sectors are land–soil related, it makes it critical to enhance the sustainability measures that are in place. There are inadequate regulatory frameworks and weaknesses in the rule of law which have allowed investors and the Zambian elite to circumvent legal requirements. Four major challenges which are common to all four key sectors (energy, forestry, mining and agriculture) in Zambia limit the capacity of the country to regulate sustainable investment, including limited incentives that support sustainable land-use investments; insecure customary land tenure with limited processes enshrined in the legal framework to uphold social safeguards, such as consultation with land users; low institutional capacity to enforce the social and

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59 See <https://www.state.gov/reports/2019-investment-climate-statements/kenya/>, accessed 5 September 2020.

environmental safeguards that are established in the law; and limited access to information on investments in Zambia, which reduces the potential for public scrutiny and participation. Thus, the legal and institutional framework in Zambia, particularly its implementation and enforcement should be strengthened. This will lead to more effective regulation of sustainable investments that adhere to social and environmental safeguards.

## 8.2 Recommendations

Improving the legal control of foreign investors is critical to guarantee the effective protection of soils. Such control is crucial in order to ensure that land-use investments are sustainable and that the laws of the countries are being observed. This can be done through the enactment of laws imposing environmental degradation taxation, such as for pollution or soil contamination, to be paid by all (foreign and domestic) investors. Legalisation of certification schemes of commodities production susceptible to causing soil degradation is need as is the promotion of land reforms that limit the amount of land that can be acquired by foreign investors or specifying area of land depending on the activity to be carried out. Fostering commitment of foreign investors to corporate social and environmental responsibility or business/corporate citizenship needs to be achieved so as to avoid social conflicts with communities. This is a self-regulating paradigm, which can help foreign corporate investors to be socially accountable to the public, thereby avoiding activities that are likely to degrade the soils on which the public depends. Therefore, corporate social responsibility (CSR) should result in foreign investors increasingly respecting the environment and promoting sustainable development practices. In the era of globalisation, different approaches to such practices will also allow a more effective protection of soils. In this light, CSR must go beyond legal obligations, but cannot be reduced to an expression of charitable compassion. It must penetrate all foreign investment practices in Africa, placing the peculiarities of the continent in relation to the benefit of any undertaking.<sup>60</sup>

Lastly, mobilising investment for sustainable development in Africa requires political commitment to overcome substantial barriers at various levels. To enable new markets for sustainable development requires adequate regulatory frameworks (international, regional and national) in order to give investors, the necessary confidence. The national state has to balance the interest of attracting (and securing) international investment while promoting peace and security for its population. The most appropriate approach for achieving both of the aforementioned is adherence to and promotion of the rule of law, while creating incentive structures for investors to act sustainably

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60 Ruppel & Tchuente (2018).

and to respect national social development goals, empowerment policies, labour standards and human rights.<sup>61</sup>

## 9 Institutional and procedural aspects

### 9.1 Institutional arrangements

The focus of the following section is on the implementation, control, monitoring and enforcement of the substantial provisions. This is a trivial statement which is at the same time both factually correct and important. Good governance depends on both good regulations and effective implementation. In other words, without effective implementation, the law itself is useless. Insufficient or ineffectual law enforcement is often a core issue in developing countries, in particular in counties of sub-Saharan Africa.<sup>62</sup> The following section is thus of great importance. The section is spilt into two subsections. In the first, options for more effectively arranging and coordinating the competencies and roles of the authorities are discussed. In the second, the procedural rights of citizens and civil society organisations, such as access to information, public participation and access to justice, are analysed and recommendations are presented.

#### 9.1.1 Competent authorities: Responsibilities, coordination and internal procedures

The following subsection discusses how effective implementation and enforcement of the substantial provisions of governmental institutions, meaning competent authorities, can be achieved. Thus, the subsection deals with the internal arrangements of the governmental institutions and provides recommendations on how these arrangements can be structured in order to heighten efficiency. Each country study reflects its own internal organisation of governmental entities (ministries, agencies and authorities) and the respective competencies and rights of these entities. Moreover, the organisational structure is undergoing constant change for pure political reasons, but also for reasons of efficiency and more. It would therefore not be particularly instructive to inform about the specific current situation in the three countries. It is of more informative value to inform about the most important, most pertinent challenges in the three countries. Overall, although to a different extent, implementation and enforcement of

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61 Ruppel & Shifotoka (2017).

62 Cf. for example: Kameri-Mbote et al. (2019); Ruppel & Kam Yogo (2018); Ruppel et al. (2017); Ruppel & Ruppel-Schlichting (2016).

existing provisions are weak. Essentially, several reasons are mentioned: lack of personal and financial resources, lack of expertise, and insufficient equipment. However, these aspects belong more to the endowment of the governmental entities and will not be discussed further in this subsection.

As one internal constraint to an effective and efficient management (i.e., the precondition of law implementation and enforcement) overlapping competencies have been reported. Often, several ministries are responsible for the same issues and they work in parallel. Simultaneously, non-existent and insufficient coordination between entities on the same level (ministries and federation) is a further reason for inappropriate law enforcement. Having ministries working on the same issue is, per se, not a big issue. It only becomes an issue if these actions remain uncoordinated. Furthermore, the competencies of different levels (federation, regions and municipalities) are often not clearly defined, which weakens effective law enforcement. To sum up, going by the three country studies, it appears that insufficient decentralisation of competencies is – generally speaking – an issue that needs to be addressed.

### 9.1.2 Recommendations

As already stated, the efficiency on the ground depends on both appropriate provisions and effective law enforcement. In order to be effective, several management tasks have to be implemented by governmental bodies (or private institutions have to be managed by the governmental bodies in order to fulfil the specific tasks). The most relevant tasks should be elucidated. An appropriate arrangement of institutional roles and competencies requires that these tasks are clearly and undisputedly attributed to specific entities. First of all, information on soil conditions and soil quality associated with ongoing activities which might affect soils and technological options needs to be gathered and disseminated among at least the competent authorities. In particular, the information gathering on soil conditions and soil quality is demanding in terms of time and human and financial resources. It requires a lot of measurements, in a high spatial resolution. Without this information effective soil management could hardly be established.

Secondly, the management task requires standard setting. This, again, is a complex, demanding and time- and resource-intensive task. Standards are important as they enable competent authorities to implement the quite vague legal provisions (e.g., protection of soils). Furthermore, standards inform potential operators what they have to comply with. Standards should, in particular, be established for soil quality with regard to soil health and physical parameters (e.g., for soil carbon, biodiversity and organic matter). These quality standards are particularly important as they define what level of interference is tolerable. In addition, emission limit values for contamination and

technical standards for used equipment can also be helpful and instructive for the competent authority.

Thirdly, soil authorities need to be involved in prior permission regimes for activities which might have negative effects on soils, such as industrial installations, the use of pesticides, and the construction of roads, highways and railways. Soil authorities should be able to identify soil concerns based on their particular soil protection expertise. Monitoring of soils is a further important task. This means that a competent authority should observe how specific soil compartments develop over time. This task is interlinked with the task of information gathering.

Finally, competent authorities need to control compliance and have substantial provisions to do so, and, where necessary, to enforce compliance by operators, in particular, and citizens, in general. Chiefs of local communities usually have quite a strong position in African countries. It would be beneficial if their roles, responsibilities and oversight are clearly regulated and would dovetail with the existing arrangements of other governmental powers.

Sustainable soil management must be achieved taking into account the local specificities. From this perspective, it seems to be reasonable to strengthen the decentralised entities, at least at the level of regions and to a certain extent at the level of municipalities or local communities. It nevertheless needs to be ensured that the legal provisions have to be considered and to be abided by. To re-arrange the institutional settings and to clearly define the competencies and roles of the various entities and, further, to decide which entity is superior and has a control function over another is, all in all, a process that courts dispute, as clarity also may mean not being responsible for specific aspects and to lose (or have no) power over certain aspects. Thus, in order to provide incentives for such a decision-making process, clear advantages and benefits need to be shown for society and, at best, for all actors concerned. These advantages and benefits will gain the political buy-in which is needed to be successful.

In the following list the potential advantages and benefits are highlighted: Clarity concerning the procedures should inspire trust in the process. People tend to regard a decision as legitimate if it is taken because of already established procedure. Clarity concerning the procedures also enables good governance. If the procedure is clearly and appropriately defined, it seems likely that decisions are taken on the basis of reason as the required information and expertise have been considered. Clarity concerning the procedures allows for accountability, reliability and transparency – all of which are ingredients of a modern and well-established civil society.

While the reputation of states could be enhanced – even at international level, more clarity would also establish a level playing field for all – including foreign investors.

A positive regulatory environment for fair and responsible investors should be formed, in order to expel detrimental foreign investments. Workable arrangements for institutions and procedures would ensure that respective states would probably be in a

better position to deal with future challenges – such as the effects of climate crisis, poverty and hunger and more.

## 9.2 Institutional setting and more effective procedures

In the following sections, various options are recommended. All these recommendations should be considered in order to achieve effective law implementation and law enforcement.

### 9.2.1 Drafting legislation in institutional settings is important and demanding

As mentioned above, the detailed determination of the specific roles, competencies and responsibilities of the various governmental entities is extremely important, in order to be able to implement the substantial provisions effectively. The determination has, at best, been made by legal provisions in order to have a clear system in place which cannot be questioned, and entities can rely on. It is important to stress that the determination of the specific roles, competencies and responsibilities is a demanding issue. This determination on its own is a political and substantive matter. It makes a real difference whether experts with pure agricultural expertise implement soil protection provisions or whether experts with specific environmental knowledge are in charge. It is also crucial which level (federal, regional or local) is considered responsible. It is clear that the procedure determines the outcomes. Thus, although this decision-making process could be time-consuming and pretty conflicting, experience clearly shows that it is worth the effort invested.

### 9.2.2 Coordination and clear distinction of competencies are essential

It needs to be underlined that a precise determination of roles, competencies and responsibilities is of enormous importance. It has to be legally stipulated which ministry is responsible for which driver and for which task. Only via such a clear and legal determination of roles, competencies and responsibilities can conflicts and overlaps in competencies be avoided. Conflicts could cause major disputes, which require effort and energy to resolve – energy which could be better invested in supporting, fostering and finally achieving sustainable soil management. Overlaps in competencies can immediately lead to conflicts, but they can also give rise to a situation where none of the competent bodies actually deal with an issue, as they await a move from another entity.

Moreover, it needs to be clarified how governmental bodies should and could cooperate. It needs to be determined whether another body has to be involved and

consulted, and what rights this other body has in legal terms. One option is that another body should be consulted, meaning it should be heard. There would then be no obligation to follow the statements of the other body. A second option is that the other body should have a veto right. That would mean that the authority in charge has to follow the advice of another body. Both aspects – which body should be involved, and what rights this body has – should be legally fixed.

### 9.2.3 Decentralisation of responsibilities is key

A further point to be considered is whether and to what extent competencies and responsibilities should be attributed to decentralised governmental entities. In general, decentralised competencies seem to be more effective mainly for two reasons. First, the regional specificities can be better assessed and taken into account by a competent authority which is familiar with the regional conditions. The alternative is a central body. It seems quite unlikely that a central body could be structurally in a position to be knowledgeable on the local and regional specificities throughout the country. The same is true for the involvement of local and regional stakeholders. Secondly, trust in decentralised administrative expertise and responsible behaviour is likely to be stronger. A precondition however is that the decentralised governmental entities responsible for sustainable soil management are sufficiently equipped with respect to competent staff and hardware.

### 9.2.4 Determination of appropriate level that is necessary depending on the management tasks

As pointed out above, there are several management tasks which governmental entities should be responsible for. The following tasks have been identified: Information gathering; standard setting; involvement of soil authorities in prior written authorisation procedures; monitoring; and control and enforcement.

It needs to be decided which would be the appropriate level to take on the various tasks. The final decision certainly depends on the specific conditions in the various countries. Nevertheless, in the following paragraphs an option is presented to underline the importance of considering the right level of competence and responsibility. Information gathering is both a management and a scientific task. As stated above, information is essential for good governance. As information on the status of soils can only be gathered at local level, local or regional entities need to be in charge of collecting this information. The compilation and synthesis should be done at national level. In this way it can be ensured that the information is made available and accessible for all

local and regional entities. Concerning information gathering, cooperation between the national, regional and local level has to be established.

Standard setting must primarily be allotted to the national level. Standards should be applicable throughout the country. Concerning the involvement of soil authorities in prior written authorisation procedures, it seems to be reasonable to relegate this task to the regional or local level. In the decision-making procedure for an industrial installation, for example, the local conditions and specificities need to be taken into account. A competent authority on regional or local level should usually be better equipped to deal with local challenges and to involve local stakeholders.

The same goes for environmental monitoring, as well as for control and enforcement. Also, in the context of these tasks, the allocation to local or regional level seems to be more efficient as the knowledge on local specificities should usually be with the respective competent local or regional bodies.

#### 9.2.5 Further mechanisms to avoid poor law enforcement

Further mechanisms to avoid poor law enforcement – which seems to be a challenge throughout Africa – comprise two aspects. First, bodies need to be equipped with sufficient resources with regard to both staff and hardware like furniture, IT equipment and computers. Secondly, the mechanisms required all seem to be instruments of public control, such as access information, public participation and access to justice. These aspects are considered in the following subsection.

#### 9.2.6 Specific control mechanisms of communities' chiefs

Local chiefs play an important role in most African countries with regard to the living conditions in the local communities. Their roles, competencies and responsibilities vary considerably, also the mechanisms to keep them accountable via instruments like documentation of their decisions, reporting to governmental entities, and random control. Cases have been reported where local chiefs have misused their powers either to neglect the requirements of environmental protection or to make short-term and unjustified earnings – sometimes to the disadvantage of the local communities which they represent.

Sustainable soil management on the local level (in the local communities or the villages) needs full awareness, support and fostering by local chiefs. Soils provide ecological functions for all, but sustainable soil management must be implemented locally. Thus, there is room for improvement. First, it seems to be reasonable that local chiefs receive more support and advice from soil scientists. Second, local chiefs must be seen as part of the whole soil-related administrative structure. Third, decisions by

local chiefs must be taken via a transparent and inclusive procedure. Fourth, similar procedural rights of citizens and the general public should apply to decisions by local chiefs about, among others, access to justice. The general aspiration should not be to more severely control local chiefs, but to enable them to do more for sustainable soil management.

### 9.2.7 Optional: extension of water authorities to water and soil authorities

Water is an issue in most African countries, thus in most, if not all, African countries there are water ministries and a complex administrative setting of competent authorities. A simple and perhaps promising approach would be to add the responsibility for sustainable soil management to the water-related entities. From a scientific point of view, this seems to be well-founded, as soil and the aquatic compartments like surface and groundwater bodies are very much interlinked and interdependent. If there is water scarcity, for example, soils are immediately affected. Thus, to manage soil and water compartments in an integrated manner is at least possible, if not reasonable. Therefore, the awareness of soil issues can be strengthened and there would be no need to establish a new administrative structure. The existing structure would just be extended with the topic of sustainable soil management. It would certainly be discussed whether such an extension is politically acceptable. However, such an extension would also underline that soils are as important to the welfare of an African society as water, owing to the ecological services which are provided by soils.

### 9.2.8 National circumstances need to be considered and accordingly adapted

The recommendations presented before must be adapted on a case-by-case basis, because of differing national preconditions. There is no single blueprint which fits all systems. However, the options should be considered seriously.

## 9.3 Procedures and procedural rights

Effective procedures which allow for a thorough assessment of all relevant aspects before taking decisions and procedural rights of potentially concerned citizens are generally regarded as essential in order to achieve good protection. Procedural requirements and procedural rights can only be effective if implemented in practice, a challenge which has been addressed in the following subsection. In the following subsection four aspects are discussed: environmental impact assessment, access to

information, public participation and access to justice. At the end, a recommendation is provided.

### 9.3.1 Environmental impact assessment

Environmental impact assessments (EIAs) in Zambia are under the responsibility of the Zambia Environmental Management Agency (ZEMA). An EIA is a requirement before any investment in land can be made. There needs to be an assessment of the effect of that investment or project on land and its components. An investment that has an adverse impact on the environment is not permitted. In Zambia, failure to undertake an environmental impact assessment contrary to law is a criminal offence. The importance of environmental impact assessments is that they enable the conservation of soil and the environment at large.

In Cameroon, it is a requirement for any developer or owner of a project to carry out an environmental impact assessment that evaluates the negative effect of the project on the environment. Both soft laws (policies) and hard laws (statutes) regulate EIA in Zambia. The procedures are clear and are well laid down, as are rules of conducting environmental and social impact assessment.

In Kenya, environmental impact assessments are an important issue cross-cutting all sectors. It is a requirement that any project must be subjected to an environmental impact assessment in order to evaluate its impact on the ecological system. This procedural right is managed by NEMA, which is an institution created under the EMCA statute. Soft law and hard law regulate EIAs in Cameroon, Zambia and Kenya.

In summary, all three countries have comprehensive legislation on environmental impact assessment. Failure to conduct an environmental impact assessment leads to a criminal offence. The regulatory bodies that manage environmental impact assessments are all created under a statute. The rationale of EIA in all three countries is to protect environment and to enhance sustainable development. However, there are some common challenges faced by the environmental impact assessment obligation in the three countries. The challenges include ineffective public participation in carrying out EIAs; inadequate personnel and over-centralisation; corruption; inadequate monitoring by the administration in charge of the environment; and procedural flaws in scoping, exorbitant administrative fees, and absence of an effective appeal procedure.

### 9.3.2 Access to information

The right of access to information is both an international right and a domestic right. It is an inherent right that is necessary in public participation and also in furthering

other rights. In Cameroon, several international laws relating to access to information are recognised. The right is guaranteed under the Convention on Access to Information, Public Participation and Access to Justice in Environmental Matters (Aarhus Convention). The right is also guaranteed under the International Covenant on Civil and Political Rights (ICCPR). Principle 10 of the Rio Declaration also calls for access to environmental information.

In Kenya, access to information is a constitutional right provided in Article 35 of the Constitution of Kenya. The procedural right is also provided for in the Access to Information Act. Access to information is limited because of some reasons such as privacy and security threats. The problem with the access to information right in Kenya is that it is only guaranteed to citizens as per the dictates of the Constitution.

In Zambia, environmental information and other rights are analogous to access to information. These rights are not stipulated outright in any legal document, but they can be inferred from the mandate of ZEMA, which is required to disseminate environmental information. In the three countries, access to information seems to be an essential right in protecting other rights. Information is power and one cannot act without information.

Some of the common problems experienced in the procedural right of access to information among the three countries include limitations by law on the right to access information; inadequate legislation as seen in Cameroon and Zambia on access to information; secrecy and the unwilling nature of the government to provide information; and restriction of the right to specific cadres of people such as citizens in the Kenyan context.

### 9.3.3 Public participation

Public participation is one of the essential elements of good and democratic governance. It is the involvement of stakeholders in decision-making. In Zambia, public participation is a constitutional requirement and is also embedded in statutory law. The requirement is that, before any law or decision affecting the environment is made, public consultation must be done. In Zambia, public participation can be done directly or through elected representatives. In Kenya, public participation is also a requirement that has been mainstreamed in almost all forms and activities of governance. It is also provided both in the Constitution of Kenya and in numerous other relevant statutes.

In Cameroon, the requirement of public participation is provided in the preamble of its Constitution and also in statutes. It is a requirement that any decision that concerns environment needs to take into consideration the views and concerns of the public. In summary, the three countries recognise the duty of public participation in making decisions.

This procedural right is embedded in both the constitution and statutory laws of the respective countries. Public participation seems to be mainstreamed in various sectors in the three countries. It is also a tenet of good governance embraced by the three countries. It has also been used as a tool to protect the environment (including soil) from several threats such as overexploitation and abuse.

However, there are some common challenges experienced around the concept of public participation in the three countries. These include – among others - amorphous structures constituting public participation. In Kenya, there has been inconsistency in respect of the judicial decision on what constitutes public participation. This in turn requires legislation for clarity purposes in terms of implementation and enforcement issues; to address inadequate information affecting the quality of public participation, which undermine rights of minorities and marginalised, hinder governance issues and the rule of law.

#### 9.3.4 Access to justice

Access to justice is one of the elements of natural justice. Justice needs to be served to all regardless of societal status. Access to justice in this sense is the access to courts of law or alternative dispute resolution mechanisms that are fair and impartial. Access to courts or justice must answer the following questions: Is there a system for identifying, preventing and resolving conflict between stakeholders such as litigation, alternative dispute resolution and administrative review? Has awareness of the system's existence been raised? Is it affordable and accessible? Does it provide timely results?

In Zambia, anyone who infringes laws that protect the environment (including soil) can be prosecuted in a court of law. Anyone whose bundle of rights has been infringed can also obtain justice from the ZEMA tribunal or courts. In Kenya, one has to exhaust other non-judicial means before approaching the court. This means that the tribunal and other administrative organs have to be contacted before heading to court.

The right to appeal decisions made by tribunals is guaranteed in Kenya, Zambia and Cameroon. Some of the challenges that affect the right of access to justice in the three countries include corruption; lagging of cases in courts; inadequate judicial officers; inadequate infrastructure and funds to support the justice system; and political influence in the administration of justice.

#### 9.3.5 Recommendations

First of all, it needs to be stated that the four instruments, namely environmental impact assessment, access to justice, access to information and public participation should be part of the legal system to ensure that environmental effects are assessed systematically

and comprehensively, and that citizens have the opportunity to obtain information, to participate in permission procedure on activities which are of concern to them, and to have access to justice. Moreover, it must be ensured that these instruments are effectively implemented. These are some of the proposals that may help to reduce the challenges that affect procedural rights: EIAs, access to information, public participation and access to justice.

The recommendations that pertain to the strengthening of these rights and, in particular, to ensure an effective soil protection environmental impact assessment should be mandatory by law for all activities which might have significant effects on soils; access to information on soil quality needs to be guaranteed; legislation should be enacted that defines the scope and structure of public participation in soil protection decision-making; resources should be invested in infrastructure that supports access to justice and other procedural rights in matters pertaining to soil protection; specialised courts on environment and land seem to be one option to strengthen the expertise of judges on soil and land topics both from a scientific and a legal point of view; programmes should be developed to raise awareness among the population of their right to access courts, to engage in public participation, and to access information and any initiatives that can facilitate the protection of soil.

Moreover, marginalised people, indigenous groups, minorities, women, youth and people with disabilities should be particularly educated and encouraged in the attainment of procedural rights such as EIAs, access to information, public participation and access to justice. The ministries of justice could be obliged to monitor the implementation of the procedural rights and to provide reports with regard to this implementation on a regular basis. Ultimately, legislation that consolidates and harmonises soil rights in African legal systems is an option that could create uniformity and cooperation in the advancement of soil protection. The African Union could play a specific role in this regard.

## 10 The role of science

### 10.1 The science and society interface

Soil science can raise awareness on soil organic matter as a key attribute of soils to illustrate its importance for soil functions and ecosystem services. Soil science can, among others, improve the transfer of knowledge about soils; contribute to educational programmes; facilitate communication with policymakers by framing research in terms that resonate with politicians in respect of the policy cycle or by considering drivers, pressures and responses affecting impacts of land use change; and help to

realise the United Nations Sustainable Development Goals (SDGs) in the most effective manner.<sup>63</sup>

In his encyclical letter *Laudato Si*, Pope Francis in 2015 made a pronouncement on the care of our common home, stating “that human beings, endowed with intelligence, must respect the laws of nature and the delicate equilibria existing between the creatures of this world”. He went on to say that “one authoritative source of oversight and coordination is the law, which lays down rules for admissible conduct in the light of the common good.”<sup>64</sup> He further stated that “science and technology are wonderful products of a God-given human creativity” and “science which would offer solutions to the great issues would necessarily have to take into account the data generated by other fields of knowledge, including philosophy and social ethics”.<sup>65</sup> Therefore, continued the Pope, “dialogue among the various sciences is likewise needed, since each can tend to become enclosed in its own language, while specialization leads to a certain isolation and the absolutization of its own field of knowledge.”<sup>66</sup>

Increasing climate change has an impact on soils, slows economic growth, threatens food security, exacerbates social inequalities, harbours the risk of violent conflicts, and increases migration movements. Many countries have implemented national climate policies to accomplish pledged Nationally Determined Contributions and to contribute to the temperature objectives of the Paris Agreement on Climate Change. And while, in 2023, the global stocktaking will assess the combined effort of countries, it is already apparent that the implementation of those policies will leave a significant emissions gap towards the well below 2 °C and 1.5 °C Paris goals.

The question arises as to how legal systems can contribute to framework conditions, for example to better protect particularly vulnerable ecosystems and groups from the consequences of climate change. Legal systems are based on certainties and not uncertainties, while science can afford certain levels of uncertainty. In order to avert the climate crisis effectively and protect soils, the right degree of legal regulations and shifted incentives seem to be crucial in motivating individual and national action for more collective success. After all, the law depends on the statements and warnings of science. If the law reaches the limits of knowledge and thus certainty, it depends on references generated in other knowledge systems (science, economy, technology, ecology, etc.).

Given the complexity of soils and the degree of uncertainty around climate change, expert systems must serve the law to provide possible reliable references. Such high complexity levels are, of course, non-linear in nature and the types of prognosis possibilistic, probabilistic or conditional. And as such science must contribute to

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63 Keesstra et al. (2016).

64 Cf. <https://bit.ly/3tN9r9i>, accessed 11 February 2021.

65 Ibid.

66 Ibid.

strengthen the resilience of individuals, societies and economies to systemic climate crisis phenomena. Science needs to inform the law and society of what cause is expected to have which effect and which concerted effects can either be prevented or constructed, and perhaps, above all, who determines what can be disregarded in the process.<sup>67</sup>

Crossing the divide between law and science raises the inevitable question of whether the legal profession is skilled enough to address the scientific needs of the legal system. After all, science and law have always existed together, and it is science which can enlighten the legal profession in revealing the truth to legislators and the courts in complex matters and by means of scientific advancement having an impact on the administration of justice.

## 10.2 Recommendations

The science and society interface is key in shaping effective laws and policies. Science must also inform the discourse on soil protection in Africa, which in turn must inspire new laws, policies and procedures that can deal with the state of crisis and enlighten a system that ensures that we ‘leave no one behind’ in the transformation towards more soil sustainability, resilience, equity, and justice.

In this light, science can help to develop indicators and standards that can guide the process towards more sustainable practices. Land degradation neutrality (LDN) interventions must be informed by science–policy interaction as a basis of responsible land governance and soil management. Effective cooperation between scientific institutions can contribute to an advancement of understanding and commitment through greater scientific engagement with stakeholders.

While universities are actors and institutions for academic and scientific diplomacy, the African Academy of Sciences and its various country chapters, the Council for Scientific and Industrial Research in South Africa, the Ghana Soil Information Service, the Cameroonian National Observatory for Climate Change and the Global Alliance of Universities on Climate are but a few examples of such emerging cooperation networks which can inform and promote research, policy development and implementation, technological innovation and entrepreneurship, and creation of jobs and relevant knowledge and skills, and also develop education and exchange programmes.

Ultimately, the independence of scientists from governmental influence and political agendas must be preserved, so as to avoid the perception that they are working towards preconceived political goals or agendas. Responsible decision-making processes also need to integrate traditional knowledge systems and citizen science.

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67 Renn (2019: 26).

## 11 Global, continental and regional cooperation

Knowledge systems and infrastructure, citizen engagement, and international cooperation gain increasing importance in the protection of ecosystems, the mitigation of natural disasters, and the halting of biodiversity loss caused by changes in land use, direct exploitation of natural resources, and climate change. In this light, a green transition and energy access can foster partnerships with and within Africa and contribute to building a low-carbon, climate resilient future and fostering sustainable development.

### 11.1 The African Union

The African Union is the core mode of continental cooperation with its several organs – among them the Pan-African Parliament, and its various programmes. The Regional Economic Communities (RECS) allow for economic cooperation on a regional level. In particular, the recently approved Agreement Establishing the African Continental Free Trade Area may pave the way for intensified regional and continental cooperation, especially in economic terms.

There are 55 sovereign states which have committed themselves to be part of the African Union – with the African Union placing these states into five regional groups: Central, Eastern, Northern, Southern and Western Africa.<sup>68</sup> In order to be admitted as member state of the African Union, three requirements must be satisfied.<sup>69</sup> The first requirement is that the state wishing to join the African Union must be African; the second requires a majority vote of approval taken by the current member states for the inclusion of the would-be member; and finally the prospective member needs to sign and ratify the Constitutive Act<sup>70</sup> of the African Union of 2001.

Articles 3 and 4 of the Constitutive Act enumerate the objectives and principles of the regional organisation, namely: regional integration; peace and security; protection of human rights; non-intervention or promotion of state sovereignty; intervention in grave circumstances within member states; and respect for democracy and rule of law.

The Constitutive Act provides in Article 13 that the Executive Council coordinates and takes decisions on policies in areas of common interest to the member states. This includes foreign trade; energy, industry and mineral resources; food and agricultural and animal resources; livestock production and forestry; water resources and irrigation; and the environment and its protection.

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68 African Union Commission and New Zealand Crown (2020).

69 Lamikanra (2018: 2).

70 Ibid.

Article 5 of the African Union Constitutive Act provides for the establishment of the following institutions: The Assembly; the Executive Council; the specialised technical committees; the Pan-African Parliament;<sup>71</sup> the African Court of Justice (and Human Rights); the financial institutions; the Commission; the Permanent Representatives Committee; the Economic, Social and Cultural Council; and other organs that the Assembly may decide to establish. Each of these has its own mandate and focus areas within the African Union.

African unity and solidarity outlined by the African Union's framework provides the continent with mutually beneficial scientific and technological advancements; a synergetic international cooperation policy; and significant economic development.<sup>72</sup> The African Union looks to intrinsically bind natural rights of the people and any right a member state may have when dealing with its sovereign development.

The African Charter for Human and Peoples' Rights has progressively taken up the issue of environmental protection by explicitly incorporating a human right to environment, a third-generation human right.<sup>73</sup> Article 24 of the African Charter for Human and Peoples' Rights reads, "All peoples shall have the right to a general satisfactory environment favourable to their development".

### 11.1.1 Vision 2063

The African Union Vision 2063: The Africa We Want. It obligates its signatories to speed up actions to ensure effective and territorial planning, land tenure use and management systems. The Regional Implementation Plan for African Soil Partnership provides several pillars and guidelines that help in the preservation and management of soil in Africa. For example, Pillar one promotes sustainable management of soil resources for soil protection, conservation and sustainable production.

Agenda 2063 has been lauded as the common continental framework for socio-economic development. This framework strives to realise the African Union's fundamental goals of creating a union that has inclusive policies which are sustainable in their development and maintenance and implement policies to entrench pan-Africanism and ensure continent-wide prosperity. In this light, the African continent and its regions are also called upon to cooperate in ensuring that, among others, soil is conserved. This is done through legislation and numerous policies that ensure that all African countries are united in the struggle to preserve and manage soil use.

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71 Also see chapter on the Pan-African Parliament of the African Union: Composition, mandate, partnerships and its quest for sustainable development in this volume.

72 Lamikanra (2018: 3).

73 See Ruppel (2008).

Agenda 2063 is rooted in the principles of the Constitutive Act, among other instruments, and it is said to be the ‘blueprint for progress’. The First Ten-Year Implementation Plan of Agenda 2063, spanning 2014 to 2023, outlines a set of goals, priority areas and targets that the continent aims to achieve at regional, national and continental levels. Some of the past and current initiatives it builds on include the Lagos Plan of Action; the Abuja Treaty; the Minimum Integration Programme; the Programme for Infrastructural Development in Africa (PIDA); the Comprehensive Africa Agricultural Development Programme (CAADP); and the New Partnership for Africa’s Development (NEPAD).<sup>74</sup>

### 11.1.2 African Convention on the Conservation of Nature and Natural Resources

The 1968 African Convention on the Conservation of Nature and Natural Resources (also referred to as the African Nature Convention or the Algiers Convention), and the forerunner to the 2003 Revised Algiers Convention, which is outlined in the next paragraph, is arguably one of the centrepieces of the African Union’s environmental texts. This regional African Convention was originally adopted in Algiers in 1968 under the auspices of the Organisation of African Unity (OAU) and came into force in 1969. As such, it was the successor of the 1900 Convention for the Preservation of Wild Animals, Birds and Fish in Africa, which was later superseded by the 1933 Convention Relative to the Preservation of Fauna and Flora in their Natural State (also known as the London Convention). The need for a treaty to address nature conservation had already been expressed in the Arusha Manifesto of 1961. Hence, in 1963, the African Charter for the Protection and the Conservation of Nature was adopted, followed soon after by the Algiers Convention.<sup>75</sup>

The objectives of the 1968 Convention encouraged individual and joint action for the conservation, utilisation and development of soil for the present and future welfare of humankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view. To this end, states undertake to adopt the measures necessary to ensure conservation, utilisation and development of soil in accordance with scientific principles and with due regard to the best interests of the people (Article II); to take effective measures to conserve and improve the soil and to control erosion and land use (Article IV); and to establish policies to conserve, utilise and develop water resources, prevent pollution and control water use (Article V). Furthermore, the Convention imposes on states the obligation to, among other things, protect flora and ensure their best utilisation, the management of forests and control of burning, land

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74 See <https://www.nepad.org/agenda-2063/about>, accessed 12 July 2020.

75 Ruppel (2018: 124).

clearance and overgrazing (Article VI); and to conserve faunal resources and use them wisely (Article VII).<sup>76</sup>

The African Convention on the Conservation of Nature and Natural Resources of 1968 is one of the legislations that shows the cooperation in soil management in Africa. The legislation provides that state parties will take effective measures to prevent land degradation and to that effect will develop long-term strategies for conservation and management of land resources, including soil.

### 11.1.3 The African Ministerial Conference on the Environment

The African Ministerial Conference on the Environment (AMCEN) has a strong regional and sub-regional focus.<sup>77</sup> AMCEN thus builds on the potential that the RECs have to integrate adaptation measures into regional policies and socioeconomic development.<sup>78</sup> AMCEN is a permanent forum where African ministers of the environment discuss matters of relevance to the environment of the continent. It was established in 1985 when African ministers met in Egypt and adopted the Cairo Programme for African cooperation. The Conference is convened every second year. In the 2010 Bamako Declaration on the Environment for Sustainable Development, at the thirteenth session of the African Ministerial Conference on the Environment, the Conference's contribution in providing political guidance and leadership on environmental management to Africa since its creation in 1985 in Cairo was appreciated. AMCEN was established to provide advocacy for environmental protection in Africa to ensure that basic human needs are met adequately and in a sustainable manner; to ensure that social and economic development is realised at all levels; and to ensure that agricultural activities and practices meet the food security needs of the region. AMCEN's mandate includes guidance in respect of key issues related to multilateral environmental agreements, towards translating available climate science and current international climate policies in their effort to move towards practical implementation in the context of sustainable development.<sup>79</sup>

### 11.1.4 The African Continental Free Trade Area

On 21 March 2018, the Agreement Establishing the African Continental Free Trade Area (AfCFTA) was adopted by 44 African countries at a summit of the African Union

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76 Ibid.

77 Ruppel (2018: 133).

78 Scholtz (2010).

79 Cf. AMCEN (2011).

in Kigali, Rwanda. This marked another significant milestone in the history of the African Union and an important step in achieving an African Economic Community (AEC) as envisaged by the Lagos Plan of Action and Abuja Treaty. The AfCFTA was created to bolster regional and continental economic integration. It is the largest free trade area outside the World Trade Organization (WTO) and a milestone set by Agenda 2063.<sup>80</sup>

As the focal point of African trade,<sup>81</sup> the AfCFTA is a framework agreement consisting of the Agreement Establishing the Continental Free Trade Area, Protocol on Trade in Goods, Protocol on Trade in Services, and Protocol on Rules and Procedures on the Settlement of Disputes.<sup>82</sup> It also envisages protocols on investment, intellectual property rights, and competition policy.<sup>83</sup> As an ‘umbrella’, the AfCFTA’s goal is to harmonise trade by placing certain obligations on all signatory members with regards to a larger continental FTA.<sup>84</sup> It is expected that, under the AfCFTA, restrictions on direct foreign investment will be lifted, which will add capital to expand local industries and boost domestic businesses. Not only will the economy be stimulated by the upward productivity cycle caused by new capital, also banking systems could be stimulated, leading to more investment and consumer lending.<sup>85</sup> African companies will be able to enter new markets, which will expand their customer base and result in new products and services.<sup>86</sup> Importing raw materials from other African countries will become less cumbersome.<sup>87</sup>

Implementing the AfCFTA will also allow Africa to keep its global commitments under the Sustainable Development Goals (SDGs). In agriculture – still the largest employer on the continent – small-scale farms form about 80% of the production.<sup>88</sup> Many emerging African markets are traditional economies that rely on farming for employment. Small family farms cannot compete with large agribusinesses in high-income African countries such as South Africa, Kenya, Egypt and Nigeria.<sup>89</sup>

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80 Magwape (2018: 355–357).

81 Ibid.

82 Tralac (2019: 1–4).

83 Ibid.

84 Magwape (2018).

85 Akeyewale (2018: 14).

86 Ibid.

87 Akeyewale (2018: 15).

88 Songwe (2018).

89 Akeyewale (2018: 14).

### 11.1.5 New Partnership for Africa's Development<sup>90</sup>

Another indication of cooperation is the Action Plan of the African Union New Partnership for Africa's Development (NEPAD) Environment Initiative. The plan seeks to build the resilience of landscapes within the African continent and particularly drylands and other vulnerable areas. NEPAD was initially adopted in 2001 in Lusaka, Zambia, by African Heads of State and the government of the OAU in 2001 and was ratified by the African Union in 2002. Its overall aim is to promote partnership and cooperation between Africa and the developed world, and it envisages the economic and social revival of Africa. Its founding document states:<sup>91</sup>

This New Partnership for Africa's Development is a pledge by African leaders, based on a common vision and a firm and shared conviction, that they have a pressing duty to eradicate poverty and to place their countries, both individually and collectively, on a path of sustainable growth and development, and at the same time to participate actively in the world economy and body politic. The Programme is anchored on the determination of Africans to extricate themselves and the continent from the malaise of underdevelopment and exclusion in a globalising world.

A healthy and productive environment is a prerequisite for NEPAD.<sup>92</sup> Relevant to soil protection, NEPAD recognises that the region's environmental base must be nurtured, while promoting the sustainable use of its natural resources. To this end, the initiative targets eight subthemes for priority intervention: combating desertification; wetland conservation; invasive alien species control; coastal management; global warming; cross-border conservation areas; environmental governance; and financing. NEPAD is underpinned by the notion of sustainable development in that it takes account of sustainable economic growth, income distribution, poverty eradication, social equity and better governance. NEPAD is primarily implemented at the Regional Economic Community (REC) level. It is widely used by international financial institutions, United Nations agencies and Africa's development cooperation partners as a mechanism to support African developmental efforts.<sup>93</sup>

## 11.2 Regional Economic Communities

The Regional Economic Communities (RECs) also constitute pillars of African Union cooperation. The Abuja Treaty, which was adopted in June 1991, came into force in 1994. Since then, most African Union member states have signed the Treaty and several RECs have been established on the continent. At the seventh ordinary session of

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90 Ruppel (2018: 135).

91 NEPAD founding document available at <http://www.nepad.org/resource/new-partnership-africas-development>, accessed 25 June 2020.

92 Preamble to Chapter 8 of the NEPAD documentation, titled The Environmental Initiative.

93 Cf. <https://au.int/en/organs/nepad>, accessed 12 July 2020.

the African Union's Assembly of Heads of State and Government in Banjul, The Gambia, in July 2006, the African Union officially recognised eight such communities, namely, the Arab Maghreb Union (AMU); the Community of Sahel-Saharan States (CEN-SAD); the Common Market for Eastern and Southern Africa (COMESA); the East African Community (EAC); the Economic Community of Central African States (ECCAS); the Economic Community of West African States (ECOWAS); the Intergovernmental Authority on Development (IGAD); and the Southern African Development Community (SADC),<sup>94</sup>

Originally established for mutual economic gain within the geographic communities, these RECs now aim to promote wider economic growth through the auspices of the African Economic Community (AEC) and are instrumental in the cultivation of norms and institutions centred on security.<sup>95</sup> Environmental concerns have, at least to some extent, found their way into the legal framework of many RECs.<sup>96</sup>

In SADC for example, with the 2003 Declaration on Agriculture and Food Security, Heads of State and government gave substantial means to some specific objectives laid down in Article 5 of the SADC Treaty, namely the promotion of sustainable and equitable economic growth and socioeconomic development to ensure poverty alleviation, with the ultimate objective of its eradication and the achievement of sustainable utilisation of natural resources and effective protection of the environment. With this Declaration, SADC member states committed themselves to promoting agriculture as a pillar of strength in national and regional development strategies and programmes, in order to attain their short-, medium-, and long-term objectives relating to agriculture and food security. Moreover, the SADC Protocol on Environmental Management for Sustainable Development, which was adopted in 2014, provides a basis for future avenues of tackling matters related to environmental impact assessment with a transboundary approach. The overall objective of the Protocol is to promote sustainable utilisation and transboundary management of the environment, in the interests of SADC member states. The Protocol covers a wide range of environmental issues, including climate change, waste and pollution, chemicals management, biodiversity and natural heritage, sustainable land management, and marine and inland water resources, as well as cross-cutting issues such as gender, science and technology, and trade and investment. The Protocol, which has yet to come into force, may become relevant for soils protection as it provides that state parties cooperate, among others, by facilitating the development, implementation and coordination of environmental assessment procedures, environmental management instruments and standards with the aim of enhancing the protection of the environment, to promote equitable and sustainable use of natural resources, to promote the shared management of transboundary environment

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94 Ruppel (2009: 276).

95 Lamikanra (2018: 6).

96 Ruppel (2016: 100).

and natural resources, and to promote effective management and responses to the impacts of climate change.

### 11.3 Recommendations

While improving soil law and governance under the structures of the African Union and Regional Economic Communities (RECs), new legislative frameworks need to be developed to strengthen national strategies and policies and fill existing gaps in terms of implementation, among other things. For this matter, channels for finance and other support are needed also to enhance the capacity on the ground. Improving African soil governance must further address options for enhancing coordination and coherence between the national policymakers, RECs parliamentary forums and the African Union structures at large.

The African Continental Free Trade Area (AfCFTA) agreement will create the largest free trade area in the world, measured by the number of countries participating. The pact will connect 1.3 billion people across 55 countries with a combined GDP valued at US\$3.4 trillion. It has the potential to lift 30 million people out of extreme poverty but achieving its full potential will depend on putting in place significant policy reforms and trade facilitation measures.<sup>97</sup>

Enabling free trade needs hand-in-hand action at both the supranational and national levels. Potential negative externalities of trade on soils should not be neglected. Moreover, regional communities can provide framework potential for reform, for example, by bringing together regulators to define harmonised standards or to agree on mutual protection interests. In this light, the African Union and particularly its Pan-African Parliament and its members can play a role to ensure harmonisation with Agenda 2063 through integration of the SDG indicators.<sup>98</sup>

In the UNFCCC process, feed in through the African Group of Negotiators should strengthen the views on soil protection, also using the findings of this project. With a view to fulfilling obligations related to the Paris Agreement, Nationally Determined Contributions (NDC) cooperation opportunities may contribute to fostering long-term climate action and mobilising means of implementation – finance, capacity-building, technology development, and transfer – on the continent. While all 54 countries have signed the Paris Agreement and submitted NDCs, many have also ratified them. However, in numerous instances, NDCs were drafted hastily, not fully taking all related interests into consideration.

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97 World Bank (2020).

98 Also see chapter on the Pan-African Parliament of the African Union: Composition, mandate, partnerships and its quest for sustainable development in this volume.

Lastly, for African and existing REC courts to contribute successfully to dispute settlement (which could also become relevant in the context of soil protection and management) there is great opportunity and potential for the future. Until now, however, frequent failures often prevented the attainment thereof.<sup>99</sup>

## 12 Outlook

This chapter contains a collection of options through which legislation on soil protection in African states could be enhanced and improved. This collection is based on a summary of recommendations set out in the three country studies and on a synthesis of consultative suggestions – for the various sectoral regulations relevant for sustainable soil management. The chapter is encouraging, as has been the entire project “Mapping out options for model legislation for sustainable soil management in Africa”. The recommendations form an excellent starting point for future improvements of national legislation in the various African states and for the development of a specific model law, which could be elaborated upon, as well as adopted and promoted by the Pan-African Parliament.

It needs to be mentioned, at this juncture, that the – intentionally chosen – consultative bottom-up approach has been a major success factor in the development of such a convincing set of recommendations. It is certainly recommended that this approach – with the involvement of African experts and local stakeholders – should also be applied when working on national level legislation or while drafting a model law for the African continent. In addition, such a consultative approach should not be limited to African states only. The issue of establishing sustainable soil management addresses transnational and international interests, such as foreign investments in land, intracontinental and international trade or financial aspects. Thus, our African project has the quality to serve as an incentive and model for other countries in the world, promoting a vivid exchange of views and experiences while comparatively analysing the various facets of sustainable soil management in their full complexity.

In conclusion it can be stated without prejudice, that both this chapter and the project in its entirety distilled valuable information and workable recommendations. However, a long journey begins with but a single step and much more needs to be done to bring justice to Africa, and in particular to its women, children and the youth. The pristine nature and magnitude of the wonder of this continent oblige all of us to protect Africa as the cradle of humankind, and its soil, of which we are but custodians.

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99 Cf. Ruppel (2012).

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