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Legal Gaps and Contradictions in Environmental Preservation in Small-Scale Sand Mining in Tanzania: Brewing Climate Change?

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Abstract

Sand mining activities are increasing globally, propelled by government and private construction projects. While important for development, if inadequately regulated, sand mining can negatively impact the environment. In Tanzania, sand mining and the environment are regulated both at the national (central government) and local government levels in Tanzania. Through a desk-based analysis of legislation and regulations relevant to sand mining in Tanzania, this paper reveals that Tanzania's legal regulation of sand mining is not robust enough to guarantee environmental preservation and safeguard against climate change. Weaknesses include legal gaps such as contradictions on aspects such as the distance to keep from ecologically sensitive zones, size of the sand mining sites, and adoption of the precautionary principle in sand mining. The paper recommends that Tanzania may borrow experiences from Kenya and South Africa on how best to regulate sand mining and guarantee its environmental and climate conservation.

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1. INTRODUCTION

Sand mining activities are reported to increase at the global and national levels.[1] These activities accounts for more than 80% of the global metal and minerals extractions.[2] Such a surge is influenced by the exponential increase in construction activities. Construction of roads, irrigation and other civilian infrastructure is relevant to sustain people's lives.[3] Notably, however, the increased extraction of sand to meet such demands poses significant environmental and climatic threats if not properly regulated. This concern is particularly alarming when sand mining occurs on a small scale, where regulations tend to be less stringent compared to large-scale mining operations, such as those for precious metals. Arguably, without effective regulation, sand mining threatens efforts to safeguard the environment, and its cumulative effects may even contribute to climate change.[4] Sand mining is reportedly responsible not only for the clearance of vegetation, contributing to land degradation and the destruction of ecosystems and biodiversity, but also for contributing to the emission of greenhouse gases (GHGs) and exacerbating climate change in the areas where it takes place.[5] Despite these concerns, global and national sand mining remains largely unregulated.[6]

Sand can be defined and classified into various categories. Among these are mineral sands, which are primarily used for industrial applications, such as lime-based sand.[7] Another category is aggregates, which are composed of both naturally occurring sand and or recycled sand from demolished infrastructures.[8] This paper deals with the naturally occurring sand in rivers, lakes, oceans and or terrestrial lands. The choice of naturally occurring sand, over the recycled sand, is based on the potential environmental challenges associated with its extraction and transportation, which contribute to climate change.

The literature in Tanzania lacks comprehensive data on the annual volume of sand mined. The available data mainly focus on sand used for industrial applications.[9] The volume of naturally occurring sand is mentioned only in terms of the amount recovered from illicit trading, not the actual quantity mined or traded.[10] Additionally, the available evidence do not specify whether the sand was mined on a small, medium, or large scale, as is typically done for precious metals.[11] This, however, does not mean that sand mining is not taking place in Tanzania. Consequently, several legal measures have been put in place to regulate it. These include

[1] Sara Katz-Lavigne, Saumya Paudey and Bert Suyken, 'Mapping Global Sand: Extraction, Research and Policy Options'. p. 49.

[2] UNEP and University of Queensland, 'Mineral Resources Governance and the Global Goals: An Agenda for International Collaboration' (UNEP 2022). para 4.

[3] UNEP, 'Sand and Sustainability: Finding New Solutions for Environmental Governance of Global Sand Resources' (UNEP 2019). para 2.; Katz-Lavigne, Paudey and Suyken (n 4).; UNEP and University of Queensland (n 5). para 1.

[4] Mineral resources governance 2019. Para…

[5] UNEP, 'Sand Sustainability: 10 Strategic Recommendations to Avert a Crisis' (UNEP 2022).; National Audit Office, 'Study on the Status of Environment with a Focus on Land Degradation, Forest Degradation and Deforestation' (Controller and Auditor General of Tanzania 2018).

[6] UNEP, 'Sand and Sustainability: Finding New Solutions for Environmental Governance of Global Sand Resources' (n 6). para 2.;UNEP and University of Queensland (n 5). para 9. ;Bert Suyken, Melissa Marschke and Jean-Francois Rousseou, 'Locating Sand' (2023) 15 Extractive Industry and Society. p. 3.

[7] UNEP, 'Sand and Sustainability: Finding New Solutions for Environmental Governance of Global Sand Resources' (n 6). para 2.1.

[8] ibid. para 2.1

[9] Mining Commission, 'Annual Report 2020-2021' (Mining Commission 2022). Table 12.

[10] ibid. Table 14.

[11] ibid. Table 4.

mining laws, environmental-related laws, and their respective regulations and by-laws.[12]

Despite these legal measures, sand mining is reportedly carried in a manner that harms environment in most countries and Tanzania in particular.[13] As noted above, common harms associated with sand mining include land degradation, deforestation, loss of biodiversity, and the emission of greenhouse gases (GHGs) due to long-distance transportation, among others. Environmental harm resulting from these activities contributes to climate change, with far-reaching impacts that extend beyond national borders. However, this nexus is underpinned by a weak legal framework governing sand mining in Tanzania, both at the national and subnational levels. This article, therefore, seeks to answer the question: To what extent does the legal framework regulating small-scale sand mining ensure environmental preservation as a means of mitigating potential climate change?

This study adopted a desk-based research approach. It is based on the review of statutes and regulations both local and foreign for primary data.[14] While not typically comparative, it borrows best practices from other natural resources-rich African countries such as South Africa and Kenya. Such experience is expected to inform Tanzania's efforts to safeguard environment and mitigate climate change in sand mining activities.

Structurally, this paper is organized into five sections, including this introduction. Section Two provides a descriptive conceptualization of two key terms used in the paper: *Sand mining* and *climate change*. Section Three outlines the legal framework governing environmental and climate preservation in the context of sand mining. Section Four discusses the legal gaps and contradictions identified within the existing framework. Finally, Section Five presents the conclusion of the paper.

2. CONCEPTUALIZING TERMS

This section provides a descriptive presentation of two key concepts used in this paper: *sand mining* and *climate change*. The need to define these terms arises from the recognition that anthropogenic development activities on Earth are inevitable. However, such activities should be undertaken with consideration for their potential impact on environmental preservation and the mitigation of climate change, which remains a pressing global concern. In many cases, resource-rich African countries struggle to strike a balance between environmental conservation and the pursuit of development projects.[15] When such a balance is not achieved, the environment and

[12] The Mining Act 2018.;The Environmental Management Act 2004.; The Village Land Act 1999.;Land Use Planning Act 2007.; The Mining (Environmental Protection for Small-Scale Mining) Regulations 2010.;The Mining (Mineral Rights) Regulations 2018.

[13] Christina Shitima and Bert Suyken, 'Formalization of Sand Mining in Dar Es Salaam, Tanzania' (2023) 82 Resource Policy.; Christina Shitima and Bert Suyken, 'River Sand Commodity Chain in Tanzania: Stakeholders, Governance and Environmental Impacts'. p. 34.

[14] Mark Hoecke, 'Legal Doctrine: Which Method(s) for What Kind of Discipline?' in Mark Hoecke (ed), *Methodologies of Legal Research: Which Kind of Method for What Kind of Discipline?* (Hart Publishing 2011).

[15] A Duplesis, 'The Balance of Sustainability Interests from the Perspectives of the African Charter on Human and Peoples' Rights' in Michael Faure and Du Pessis Willemien (eds), *The balancing of interest in environmental law in Africa* (Pretoria University Law Press 2016).; Tumai Murombo, 'Balancing of Interest through the Framework Environmental Legislation in Zimbabwe' in Michael Faure and Du Plessis Willemien (eds), *The balancing of interest in environmental law in Africa* (Pretoria University Law Press 2011).;Robert Kibugi, 'Development and Balancing of Interest in Kenya' in Michael Faure and Du Pessis Willemien (eds), *The balancing of interest in environmental law in Africa* (Pretoria University Law Press 2011).

ecosystem are typically jeopardized. Notably, long-term environmental harm is closely linked to the broader concern of climate change, which has profound impacts on human beings, animals, and other components of the ecosystem.

2.1 Sand mining

Sand mining occurs in various forms and scales, depending on its availability and demand. The United Nations Environment Programme (UNEP) defines sand mining as the acts that involve removal of naturally occurring sand from its environment, such as land, riverbanks, riverbeds, and oceans, for various uses.[16] Same definition is adopted by South African provincial regulations on sand mining.[17] Sand mining is commonly carried out on a large, medium, or small scale. Large-scale sand mining, for instance, involves the extensive use of mechanical and technological equipment. In areas where terrestrial sand sources are either unavailable or depleted, dredging is often employed to extract sand from oceans, lakes, or riverbeds. Dredging is a highly mechanized process in which sand is harvested in large quantities and pumped into a plant that separates it from water and gravel before it is stored for sale.[18] In this article, sand mining refers specifically to small-scale extraction of sand, which is often less mechanized and primarily carried out using rudimentary tools. Shitima and Suyken refer to individuals engaged in such activities collectively as *chepe.*[19]

2.2 Climate change

Climate change is not a new phenomenon in the current global discourse on environmental issues. Although it is not a direct element of environmental law, climate change largely results from long-term (typically over ten years or more) significant impacts on the environment. These environmental harms may be caused by human development activities as well as natural events, such as volcanic eruptions.[20] It is noted above that, human activities however, seem to exacerbate climate change owing to their harmful impacts on environment such as; clearing vegetation, emission of GHGs and variation of water table to name but a few.[21] However, unlike general environmental issues, climate change represents a long-term variation in global weather patterns, evidenced by rising temperatures, increased frequency of storms and strong winds, prolonged droughts, and recurrent flooding.[22] Notably, small-scale sand mining seems to be poorly regulated, and as a result, its long-term environmental impacts pose a threat to exacerbating climate change. The following discussion presents the legal framework relevant to regulating environmental and climate preservation in small-scale sand mining in Tanzania.

3. LEGAL FRAMEWORK REGULATING ENVIRONMENTAL AND CLIMATE PRESERVATION IN SMALL-SCALE SAND MINING

As noted earlier, Tanzania has adopted several legal measures to ensure environmental and climate preservation in sand mining activities. This section reviews these measures. While the mining sector is regulated by a range of laws, this discussion focuses on the following: the Constitution, laws governing permanent

[16] UNEP, 'Sand Sustainability: 10 Strategic Recommendations to Avert a Crisis' (n 8). p. ix.
[17] Steve Tshwete Local Municipality, Sand Mining by-laws 2021. para 1.1.
[18] Texas Commission on Environmental Quality, 'Regulatory Guide: Best Management Practices (BPMS) for Sand Mining Operations in the San Jacinto River Watershed'. para 4.1.
[19] Shitima and Suyken, 'River Sand Commodity Chain in Tanzania: Stakeholders, Governance and Environmental Impacts' (n 16).
[20] Tanzania, Vice President's Office, 'National Climate Change Strategy'. p. xxi.
[21] See para 1 above.
[22] VPO, 'National Climate Change Response Strategy 2021-2026'. para 2.2.1.

sovereignty over natural resources, laws regulating land and mining issues, environmental laws, water and forest management laws, and land use planning laws. These laws were selected because, collectively, they form a comprehensive framework addressing both environmental and climate-related issues in the mining sector. Their strengths, therefore, contribute to the preservation of the environment and the safeguarding of climate conservation in all mining activities.

To begin with, the Constitution of the United Republic of Tanzania (URT) and the law governing Permanent Sovereignty over Natural Resources (PSNR) recognize that all natural resources belong to the people of Tanzania.[23] However, these laws vest the management and control of these resources in the President, who acts as a custodian on behalf of the citizens.[24] This means, firstly, that it is the government, led by the President, which regulates access to and use of these resources on behalf of the people by enacting laws and signing contracts related to their extraction.[25] Secondly, no one may access or use mineral resources, such as sand, without government authorization. [26]

In particular, the law requires all who intends to access and or explore, prospects, carry out mining activities, to acquire relevant licenses from the Mining Commission.[27] The aim of regulating mining activities through licenses, for example, includes not only generating revenue but also addressing the need to regulate the potential environmental impact. As will be discussed below, environmental considerations are integral to the licensing procedure. Consequently, any law regulating access to and use of natural resources must require those involved to obtain the relevant permits or licenses before engaging in extraction activities.

Next, land use and planning are also crucial aspects in the regulation of sand mining activities. For instance, land laws require that all land occupiers be involved in decisions that will affect the land they occupy.[28] It also requires anthropogenic activities such as sand mining, human settlement and or agricultural activities be planned as a means to efficiently utilize land resources.[29] These legal requirements aim to ensure that the community not only participates in decisions regarding the utilization of their resources but also that their views, experiences, and traditions, unique to the environment they inhabit, are considered in the development process. This is particularly important in the current global push for nature-based solutions to combat climate change, which calls for the integration of indigenous local knowledge.[30] Mtavangu shows that there is an inseparable linkage between environmental preservation and human development.[31] Consequently, land use plan is

[23] United Republic of Tanzania Constitution 1977.; Natural Wealth and Resources (Permanent Sovereignty)Act 2017. s 8.; Mining Act 2018 (CAP123). s 5.

[24] United Republic of Tanzania Constitution. Art. ;Natural Wealth and Resources (Permanent Sovereignty)Act. s 8.

[25] John Ombella, 'International Obligation of Mineral-Resources-Rich States to Share Benefits from the Mining Sector to Local Communities: Tanzanian Perspectives' in Ines Kajiru and others (eds), *Economic development and human rights in contemporary sub-Saharan Africa* (Springer Nature 2025). pp.189-190.

[26] ibid.

[27] Mining Act. s 6.

[28] The Village Land Act. s 3(1) (i)

[29] Land Use Planning Act.

[30] Clifton Cotrell, 'Avoiding a New Era in Biopiracy: Including Indigenous and Local Knowledge in Nature-Based Solutions to Climate Change' (2022) 135 Environmental Science and Policy. p 167.; Nancy Grimm and others, 'Nature-Based Solution and Climate Change Resilience' in Timon McPhearson, Nadja Kabisch and Niki Franzeskaki (eds), *Nature-based solution for cities* (Edward Elgar Publishing Limited 2023).p23.

[31] Vicent Mtavangu, 'Roles of Environmental Rights in Fostering Economic Development in Africa' in Ines

a tool to guarantee sustainable land use in any community if it is effectively involved in decision making.

Thirdly, environmental and resource management laws form another important set of regulations worth identifying and discussing. Relevant laws in this regard include those related to environmental management, as well as forest and water resources management. To better present these laws, three key aspects are worth exploring. First, these laws call for environmental protection in all anthropogenic activities. As such, small-scale sand mining (SSSM) activities contribute to environmental degradation, both globally and in Tanzania specifically.[32] Owing to such a record but also supported with the precautionary principles, environmental laws require that prior to SSSM activities preparation of Environmental Protection Plan (EPP).[33] Similar to the Environmental Impact Assessment (EIA) conducted for large-scale development projects, the Environmental Protection Plan (EPP) identifies potential environmental harm caused by small-scale sand mining (SSSM) and outlines measures to address these issues. Despite recent amendments to the Environmental Management Act (EMA) aimed at incorporating climate change considerations, the EPP remains focused primarily on environmental issues. In other words, climate change aspects are not fully integrated into the EPP.

Next, there are regulations concerning the distance that anthropogenic activities must maintain from water resources. Water is essential not only for human life but also for plant life. The need to preserve and conserve water resources and their ecosystems is recognized as a critical tool for addressing climate change, as highlighted in the following statement:

> …escalating destruction, degradation, and fragmentation of ecosystems would reduce their capacity to store carbon, leading to increases in greenhouse gas emissions, diminishing the resilience and stability of ecosystems, and making the climate change crisis even more challenging…[34]

Consequently, environmental and natural resources management laws set a distance from which human activities are not allowed within the reach of water resources. The general distance provided for under the environmental management law is 60 meters.[35] However, there is a sector specific law setting a distance of 200 meters instead.[36]

This section demonstrates that there is a relevant legal framework that can be relied upon to mitigate environmental and climatic harm caused by small-scale sand mining (SSSM) activities. However, as highlighted above, the discussion reveals several weaknesses in the legal framework, particularly in addressing the growing demand for sand in construction and the global threats of environmental degradation and climate change. To further explore these weaknesses, the next section presents the examination of

Kajiru and others (eds), *Economic Development and Human Rights in Contemporary Sub-Saharan Africa* (Springer Nature 2025). p 40.

[32] See para 1 above.

[33] The Mining (Environmental Protection for Small-Scale Mining) Regulations.

[34] UNEP, 'COP14 at Sharm El-Sheikh, Egypt, on 17–29 November 2018'.

[35] The Environmental Management Act. s 57; Water Resources Management Act 2009 (11). s 34

[36] Mining Act. s 95 (1) (a) (iii).

[37] The Forest Act 2002. s 26.

[38] Protocol on forestry 2002.

[39] Draft ministerial declaration of the high-level segment of the eleventh session of the United Nations Forum on Forests International arrangement on "The forests we want: beyond 2015" 2015. para 2.

[40] The Forest Act. s 26.

legal gaps and inconsistencies that appear to hinder Tanzania's efforts to protect its environment and curb the widespread effects of climate change.

4. LEGAL GAPS AND CONTRADICTIONS

As discussed above, mineral-related laws appear to have gaps and, at times, contradictions that hinder their effectiveness in environmental preservation in sand mining.[41] This section is therefore organized into two main segments: the first addresses legal gaps, while the second focuses on legal contradictions. Unlike the previous section, this part adopts a critical explanatory approach. Relevant and recurring themes are extracted from the legal instruments and presented in a way that logically leads to conclusions.

4.1 Legal gaps

The term gap seems to have several meanings under the ordinary English dictionary. This study however, adopts the dictionary meaning related to a missing part.[42] Regarding legal gaps, this section identifies missing legal aspects that could have better addressed environmental and climate change considerations in sand mining activities. A legal gap indicates that the law is silent on a particular issue, which can be interpreted as the law permitting such an issue. This section therefore reviews mineral-related laws to identify and explore the legal implications of these gaps. As mentioned earlier, the paper draws on the experiences of other natural resource-rich African countries. Key aspects discussed in this section include: the requirement for licenses in sand mining, precautionary measures in sand mining, 'no-go' zones, the size of land subject to sand mining, and the depth of sand mining.

Firstly, sand mining activities are subjected under the mineral related laws in Tanzania. The Mining Act for example, prohibits any one carrying out mineral exploration and or actual mining without relevant license:

> A person shall not on or in any land to which this Act applies, prospect for minerals or carry on mining operations or processing operations except under the authority of a mineral right granted or deemed to have been granted, under this Act.[43]

The Mining Commission is empowered to issue all types of licenses in the mineral sector.[44] Although there a numerous type and classes of licenses issued by the Mining Commission, the one relevant to the case at hand is Primary Mining License (PML).[45] This is the form of mining licenses issued to small-scale mining activities unlike the Special Mining License (SML) issued to large-scale mining activities.

In particular, a Prospecting and Mining License (PML) is issued subject to the following conditions: if the applicant is an individual, they must be a citizen of Tanzania; if a firm, all members must be Tanzanian citizens; and if a company, it must be registered, managed, and operate in Tanzania, with all its members being Tanzanian citizens.[46] As such, small-scale mining activities are exclusively left for the locals to operate and the government may even allocate a special area for their activities.[47]

Notably, the legal requirement to acquire license before one operates in small-scale

[41] See para 3 above.
[42] Margaret Deuter, Jennifer Bradbery and Joanna Turnbul, 'Oxford: Advanced Learner's Dictionary'. p. 626.
[43] The Mining Act. s 6.
[44] ibid. s 22.
[45] ibid. s 7.
[46] ibid. s 7(2).
[47] ibid. s 16.

mining activities resonates to the power entrusted to the government to deal with mineral resources for and on behalf of Tanzanians.[48] It further guarantees that such arrangements bring benefits to Tanzanians and no one else. Among such benefits are revenue which is collected by the government. Inversely it curbs possibilities of illicit exploration of mineral resources. Illicit exploitation of mineral resources is defined to mean and include all mining activities that do not conform to the laws and best practices in resources extractions such as extracting minerals without relevant license.[49]

In particular, with regard to subsidiary legislation regulating small-scale mining activities in Tanzania, it is worth noting that it appears to be silent on the issue of licensing. As such, this regulation lacks an explicit provision requiring licenses before one engages in small-scale mining activities. It assumes that everyone involved in small-scale mining activities already holds a PML, as indicated above. Drawing from Kenya's experience, regulations prohibit the removal and transportation of sand without prior approval from the relevant authorities.[50] It is shown that the licensing procedure in Kenya goes hand in hand with initiatives to safeguard environment through conducting of Environmental Impacts Assessments (EIA) as further clarified below.[51] In addition, it is noted in South Africa that, no one may extract and or transport sand without the relevant permit from the respective authorities.[52] Consequently, regulating access to and use of sand through permits and or license is one way through which environmental considerations are factored in sand harvesting.

Secondly, environmental preservation involves, among other measures, setting aside areas designated for conservation. These conserved areas are kept free from anthropogenic activities, such as SSSM, in order to ensure the preservation of biodiversity and ecosystem continuity. In particular, SSSM activities are known for their significant impacts on riverbanks, riverbeds, and forest reserve areas.[53] In Kenya for example, sand mining activities are prohibited in areas such as burial sites and areas of ecological importance, and with the range of 100 meters of critical infrastructures to name but a few.[54] However, there is directive that sand should not be mined in any river banks aim at conserving the river ecosystem among others.[55]

In South Africa for example, sand mining activities are not allowed to be carried on the land whose title deed contain contradictory conditions.[56] Consequently, if the title deed or the law designates land as set aside for ecological, biodiversity, or cultural heritage purposes, SSSM activities may not be permitted. Indeed, limiting anthropogenic activities in sensitive ecological sites aligns with environmental preservation efforts and the broader goal of addressing climate

[48] Natural Wealth and Resources (Permanent Sovereignty) Act 2017.
[49] Protocol Against the Illegal Exploitation of Natural Resources 2006.
[50] The Environmental Management and Coordination (Sand Harvesting Control and Management) Regulations 2022. Regulations 10(1) vide Regulation 16.
[51] ibid. Regulation 16.
[52] Steve Tshwete Local Municipality, Sand Mining by-laws. para 5.2.
[53] Sian Bradley, 'Mining's Impacts on Forests: Aligning Policy and Finance for Climate and Biodiversity Goals'. pp 24-25.; Denis Shoko, 'Small-Scale Mining and Alluvial Gold Panning within the Zambezi Basin: An Ecological Time Bomb and Tinder Box for Future Conflicts among Riparian States'.;
[54]The Environmental Management and Coordination (Sand Harvesting Control and Management) Regulations. para 19.; Republic of Kenya, 'National Sand Harvesting Guidelines'. para 8 (d).
[55] Republic of Kenya (n 57). para 4.1 (e) and 8 (b).
[56] Steve Tshwete Local Municipality, Sand Mining by-laws. para 6.17 vide para 6.19.

variations. While Tanzania has relevant regulations specific to small-scale mining activities, they seem to lack such a prohibition. This does not mean mining is allowed everywhere, but it signals a weak legal framework in addressing environmental concerns in an era of global climate change.

Thirdly, the regulation of land subject to sand mining is inadequate under mineral-related laws. One key aspect of the area designated for SSSM is the size of the land to be subjected to mining activities. Given the nature of SSSM, the larger the land, the greater the impact on land cover and other environmental factors. In Tanzania, the maximum size of land subject to SSSM is five hectares.[57] Comparatively, this size of land is much smaller than the maximum land area designated for large-scale mining, which ranges from 10 hectares to 30,000 hectares.[58] Indeed, such a land size may seem large enough that concerns about operating unnoticed appear to be illusory. However, it has been reported that illicit sand mining activities are still occurring in various areas of Tanzania, contributing to environmental degradation. In fact, a substantial volume of illicitly extracted sand was confiscated during the 2020/2021 period alone. In parallel with this significant gap, both the law and regulations remain silent on the required distance between small-scale mining sites. Arguably, the closer the sand mines are to each other, the more vegetation is cleared, raising environmental and climate concerns. Additionally, they may contribute to the destruction of infrastructure.

Experience from South Africa offers an effective approach to limiting environmental and climate concerns in SSSM activities. To achieve this, South African regulations limit the size of SSSM sites. In this regard, the South African stance is similar to Tanzania's in terms of the maximum land size designated for SSSM.[59] However, experience from Kenya shows that, sand mining activities should take place in a distance of at least two hundred (200) meters from one mining site to another.[60] Limiting the land subjected to small-scale mining offers a room for other socio-economic and environmental preservation activities to take place.

Fourthly, mining activities may alter the water table in areas where they occur.[61] Variation in the water table has a significant impact on vegetation cover and access to water for communities near mining sites. Consequently, the regulation of small-scale mining activities must take this reality into account. One common approach has been to limit the depth of sand excavation. In Kenya, for example, sand mining is restricted to a depth of no more than six feet.[62]

Sand mining license holders are also required to ensure that, during sand harvesting from the riverbed, enough sand is retained to preserve the water flow in the river.[63] Retention of river waters is crucial for safeguarding the river ecosystem, which is not only vital for human livelihoods but also for environmental conservation. Although the guideline does not specify what constitutes 'adequate' retention, the Technical Sand Harvesting Committee is empowered to monitor such activities.[64] In addition, sand mining is expected to be carried out concurrently with initiatives to restore the

[57] The Mining (Mineral Rights) Regulations. Regulation 7 (h).
[58] ibid. Regulation 7(a-g).

[59] Steve Tshwete Local Municipality, Sand Mining by-laws. para 6.1.
[60] Republic of Kenya (n 57). para 4.1 (b).
[61] John Ombella, 'Legal Impediments Limiting Mining-Host Communities' Access to Clean Water in Tanzania' (2021) 2 The Tanzanian Lawyer Journal.
[62] The Environmental Management and Coordination (Sand Harvesting Control and Management) Regulations. Regulation 8(a).
[63] Republic of Kenya (n 57). para 8 (a)
[64] ibid. para 4.1 (f).

areas so harvested.[65] Such a measure ensures that excavated land is covered or filled in to prevent moisture loss, which is crucial for vegetation cover and the restoration of previously cleared trees. Indeed, environmental measures in sand mining are designed to mitigate potential harms that could exacerbate the severe impacts of climate change.

This part presents the legal gaps in the environmental considerations in SSSM. As noted earlier, when sand mining activities are improperly regulated it actually exacerbate climate change. Despite this reality, both principal and subsidiary legislation regulating SSSM fail to incorporate key principles for environmental preservation and, consequently, to address climate change. The following discussion highlights the legal contradictions and their implications in the regulation of SSSM in Tanzania.

4.2 Legal contradictions

The term contradiction is defined to mean '*…lack of agreement between facts…*'[66] It means and signals that things that are being talked about and or presented do not properly align. This section focuses on legal issues related to environmental and climate preservation in SSSM. Consequently, it examines the legal mismatch and interrogates their implications in efforts to ensure that SSSM does not harm the environment or contribute to climate change. Unlike the legal gap mentioned earlier, legal contradictions signal conflicting legal positions, where one may be preferred for environmental and climate conservation. Therefore, more specific laws may provide a starting point in the case of legal contradictions, such as the Mining Act and its regulations. Key issues reviewed here include the distance of sand mining activities from water sources, sand mining and land use planning, and the distance between sand mining sites.

To begin with, states are urged to be aware of the potential environmental and climatic impacts of anthropogenic development activities. While this does not mean that such activities should be prohibited, it is crucial to conduct an assessment of their potential impacts before allowing them to take place. For large-scale development projects, Environmental Impact Assessments (EIA) and Climate Change Impact Assessments (CCIA) are required to be carried out.[67] Here, the economic benefits of the project are weighed against its potential impacts. Notably, this involves an economic analysis of the project before it is approved. The term 'economic analysis' is defined as:

> '…the use of analytical methods to assess the economic efficiency with which resources are used to meet the project, programme or policy and includes the use of valuation methodologies to assign economic values on natural resources and environmental impacts as well as incorporating these values in the cost – benefit analysis.[68]

In Tanzania, it appears that small-scale mining activities are exempt from the EIA requirement. Instead, they are required to prepare an Environmental Protection Plan (EPP). The EPP serves a similar purpose to the EIA.[69] Among the aspects that are required to

[65] The Environmental Management and Coordination (Sand Harvesting Control and Management) Regulations. para 8 (d).
[66] Deuter, Bradbery and Turnbul (n 45). p. 323.
[67] Environmental Management Act 2004. s 83.
[68] The Environmental Management and Coordination (Strategic Assessment, Integrated Impact Assessment and Environmental Audit) Regulations 2018. para 2.
[69] The Mining (Environmental Protection for Small-Scale Mining) Regulations. Regulation 3 (1).; The Environmental Management and Coordination (Strategic Assessment, Integrated Impact Assessment and Environmental Audit) Regulations. para 2.

be assessed in the EPP are: environmental impacts associated with the project, mitigation measures, the costs of such measures, the responsible parties, and their monitoring responsibilities.[70] Worth noting is the fact that a mineral license should be conditioned on this assessment. However, in Tanzania, PMLs appear to be issued before such an assessment is carried out.[71] Such an approach makes the EPP assessment a mere rubber stamp of an approved license already. Such a regulatory contradiction reflects the previously noted point that governments are more inclined to prioritize revenue over environmental preservation when mining activities are involved.[72]

Another legal contradiction arises regarding the actual distance that sand mining activities should be conducted from ecologically sensitive resources such as water bodies and forests. Environmental issues in Tanzania are generally regulated under the Environmental Management Act (EMA), which supersedes any other law when it comes to environmental matters. As noted earlier, anthropogenic activities are required to be carried out away from natural resources of ecological value, such as water bodies.[73] The law prohibits any anthropogenic activities with the range of sixty (60) meters of such resources.[74] A similar distance is also provided for under laws regulating water resources in Tanzania.[75] Notably however, the law was amended with the view to grant leverage to strategic development activities in Tanzania. Such amendment therefore allows anthropogenic activities with the range of sixty (60) meters of water resources as long as such a project is of strategic value.[76] Mining is regarded as strategic activity that can unleash developmental effects on employment, training, transfer of technology and maximize government revenue.[77] Consequently, mining once so described and qualified may take place within 60 meters of water bodies.

It is important to note that, mining is a form of investment but is exclusively regulated under the Mining Act.[78] This law among other things sets the distance from mining activities are prohibited to be carried from water bodies. The law sets a distance of two hundred (200) meters.[79] This is three times more than what the EMA originally provided. Ombella argues that this contradiction creates enforcement difficulties, given that the EMA, as the supreme law on environmental issues, overrides other laws.[80] To further illustrate this contradiction, the relevant regulations on small-scale mining provide for an even shorter distance compared to the EMA and the Mining Act. Specifically, the regulations limit mining and vegetation clearing to no less than 20 meters from any water resource.[81] This is three times less than the EMA's position before its amendments. Additionally, this distance appears to contradict the parent Act, which

[70] The Environmental Management and Coordination (Strategic Assessment, Integrated Impact Assessment and Environmental Audit) Regulations. para 2.

[71] The Mining (Environmental Protection for Small-Scale Mining) Regulations. Regulation 3 (2).

[72] See para 1.2 above.

[73] See para 3 above.

[74] Environmental Management Act.

[75] Water Resources Management Act 2009.

[76] URT, The Written Laws (Miscellaneous Amendments) Act 2021 [3]. s 6.

[77] National Economic Empowerment Council, 'National Economic Empowerment Policy'.; Ministry of Finance and Planning, 'National Five Year Development Plan 2021/2022-2025/2026; 'Realizing Competitiveness and Industrialization for Human Development'. para 1.3 and 5.3.3.

[78] Other form of investment activities are regulated under the Sheria ya Uwekezaji Tanzania 2022.

[79] The Mining Act. s 95(1)(a)(iii).

[80]John Ombella, 'Safeguarding Rights to Clean Water and Food Security for Mine-Host Communities: Analysis of Tanzania's Compliance with International Standards' ((PhD) Law, Open University of Tanzania 2022) <https://repository.out.ac.tz/3764/>.p

[81] The Mining (Environmental Protection for Small-Scale Mining) Regulations. Regulation 12.

requires a 200-meter buffer. In comparison, experience from Kenya shows that sand mining and transportation activities are prohibited within 50 meters of ecologically sensitive resources such as water bodies.[82]

Another legal contradiction is noted on the obligation of LGAs to maintain forest reserves. According to the Forest Act, LGAs are required to prepare the forest reserves plan and actually maintain and conserve forests at the district and village levels.[83] The roles of forests in regulating climate are various including; sinking the greenhouse gases, providing land cover against land degrading factor such as floods, and or wind and replenishing the atmospheric moisture through evaporation to name but a few.[84] As such, in every district and or village forest reserves anthropogenic activities are generally prohibited.

The law seems to suggest that anthropogenic activities may take place in the forest reserves if the EIA is carried prior to introducing such projects.[85] Although EIA issues are regulated by the National Environmental Management Council (NEMC), this time the law requires the EIA be carried out in the satisfaction of Director of Forests.[86] On this exceptional ground, mining activities are listed as one among other that may be carried out in the forest reserve. However, unlike other activities such as agriculture and construction of buildings in the reserve which are limited in terms of the size of the land to be used, mining is not.[87] Although, the size of land to be subjected to PLM is noted above, the silence of the Forest Act signals that several PMLs may be issued in one forest reserve but not agricultural projects whose land is limited. In addition, as already noted above, SSSM projects are exempted from EIA and are required to carry EPP instead.

It has been demonstrated in this section that legal contradictions in the regulation of sand mining activities in Tanzania manifest in two key areas. First, a contradiction arises when the Environmental Protection Plan (EPP) is conducted after the Primary Mining License (PML) has already been issued. Second, there is a conflict between the mining sector law and the general environmental law. While the Mining Act provides for a higher standard of environmental protection, the general environmental law offers comparatively less protection. Even more striking is the fact that the regulations under the Mining Act provide even less protection than the parent Act itself. These contradictions raise significant concerns about sand mining governance and seem to create a loophole for environmental degradation, which may, in turn, exacerbate the impacts of climate change.

5. CONCLUSION AND RECOMMENDATION

The key question this study sought to answer is: To what extent does the legal framework regulating small-scale sand mining (SSSM) in

[82] Republic of Kenya (n 57). para 7 (b);The Environmental Management and Coordination (Sand Harvesting Control and Management) Regulations. Regulation 8 (b-c).

[83] The Forest Act.ss 12 vide 14.

[84]Canadian Council of Forest Ministers, 'Pan-Canadian Framework on Clean Growth and Climate Change' (Canadian Council of Forest Ministers 2020). pp. 6-8.;Yericho Berhanu and others, 'Land Use/Land Cover Change-Induced Greenhouse Gas Emission in the Global Biosphere Reserve of Tropical Afromontane Forests' (2023) 21 Scientific African. p. 11.; Pro Terra Foundation, 'The Role of Forests – the Impact of Land Use Change' <https://www.proterrafoundation.org/news/the-role-of-forests-the-impact-of-land-use-change/> accessed 1 August 2024.;

[85] The Forest Act.

[86] The Environmental Management Act. s 81.; The Forest Act. s 18 (1).

[87] The Forest Act. s 18 (b)

Tanzania guarantee environmental preservation as a means to curb potential climate change? The study finds that the current legal framework is not robust enough to safeguard the environment or effectively address climate change concerns. As demonstrated above, the framework suffers from two major weaknesses, legal gaps and contradictions that hinder its effective implementation. In terms of legal gaps, the study shows that the framework lacks adequate provisions essential for environmental protection. These include clear guidelines on licensing of small-scale sand mining activities, limitations on the size of land subjected to mining, designated no-go zones, and restrictions on the depth of sand extraction. As a result, even if the existing laws and regulations were fully enforced, the environment would still remain vulnerable to the impacts of small-scale sand mining.

With respect to legal contradictions, the discussion revealed that the existing laws and by-laws regulating SSSM seem to contradict each other such that their enforcement becomes a challenge. Among key areas where these contradictions are common are: carrying out EPP after the mineral license has been issued, and distance from ecological sensitive resources such as water bodies.

It is apparent here that there are two parent legislations that contradict each other. Also, the relevant regulations under the mining sector are in contradiction with the parent Act in the mining sector. Apparently, both the parent Acts and the subsidiary legislation regulating small-scale mining activities seem weak, such that they offer less protection to the environment and thereby offer no safeguard against climate change.

SSSM impacts in Tanzania, therefore, seem to be exacerbated by the weak laws and regulations in this sector. In particular, the regulations in their current state, despite the noted weaknesses, seem to have been framed to handle small-scale mining of precious metals and not sand. Although environmental preservation in small-scale mining of precious metals should also guarantee environmental protection, provisions on the use of cyanide, tailing ponds, and retort stands signal precious metals such as gold, instead of sand.[88] Notably, however, Tanzania may borrow experience from Kenya and South Africa on aspects such as: depth of sand excavation, distance to maintain from ecologically sensitive areas, simultaneous excavation and refilling of sand mining sites, to better improve its efforts to curb climate change impacts from SSSM.

[88] The Mining (Environmental Protection for Small-Scale Mining) Regulations. Regulations; 6,8 and 12.