

Addressing Chemical Pollution in Kenya for Sustainability

Kariuki Muigua

Addressing Chemical Pollution in Kenya for Sustainability

Kariuki Muigua*

Abstract

This paper critically discusses chemical pollution and the adverse effects that toxic substances have on human rights and all the associated aspects. It highlights the adequacy of and the challenges that arise in implementation legal and policy instruments that are geared towards addressing this form of pollution, both internationally and in Kenya. The author argues that there is an urgent need to address chemical pollution in Kenya for sustainability.

1. Introduction

Chemical pollution has become a rampant problem worldwide, having huge impacts not only on the environment but also on human health and human rights generally.¹ Chemicals are, in some ways, tangible representations of human progress and development as well as scientific, technological, and agricultural innovation.² However, because chemicals are present in many aspects of daily life and can be harmful when

**PhD in Law (Nrb), FCI Arb (Chartered Arbitrator), LL. B (Hons) Nrb, LL.M (Environmental Law) Nrb; Dip. In Law (KSL); FCPS (K); Dip. In Arbitration (UK); MKIM; Mediator; Consultant: Lead expert EIA/EA NEMA; BSI ISO/IEC 27001:2005 ISMS Lead Auditor/ Implementer; Advocate of the High Court of Kenya; Prof. at the University of Nairobi, Faculty of Law [April, 2024].*

¹ *Chemical pollution – the next global crisis* (no date) *World Bank Blogs*. Available at: <https://blogs.worldbank.org/en/climatechange/chemical-pollution-next-global-crisis> (Accessed: 27 April 2024).

² *Ibid.*; see also Mohamed, M.M.A., Liu, P. and Nie, G. (2022) 'Causality between Technological Innovation and Economic Growth: Evidence from the Economies of Developing Countries', *Sustainability*, 14(6), p. 3586. Available at: <https://doi.org/10.3390/su14063586>; Dziallas, M. and Blind, K. (2019) 'Innovation indicators throughout the innovation process: An extensive literature analysis', *Technovation*, 80–81, pp. 3–29. Available at: <https://doi.org/10.1016/j.technovation.2018.05.005>; Anand, S., 2017. The role of science, technology and innovation in ensuring food security by 2030; Jasanoff, S. (2002) 'New Modernities: Reimagining Science, Technology and Development', *Environmental Values*, 11(3), pp. 253–276; *Industrialization and scientific and technological progress - UNESCO Digital Library* (no date). Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000148272> (Accessed: 27 April 2024).

Addressing Chemical Pollution in Kenya for Sustainability

misused, an alarming number of premature deaths and severe health effects on both humans and the environment result from the overuse of certain chemicals.³

Human rights agreements mandate that states make the most use of all of their resources in order to achieve both sustainable development and the achievement of human rights.⁴ Every human is reliant on their living environment. To the fullest extent possible, a safe, clean, healthy, and sustainable environment is essential for the realisation of several human rights, such as the rights to food, water, life, health, and sanitation.⁵ We cannot achieve our goals in the absence of an environment that is healthy.⁶

Despite this, it has been observed that businesses commit numerous violations of human rights, such as poisoning communities, workers, and consumers with toxic substances from extractive industries, using pesticides in agriculture, using industrial chemicals in manufacturing, emitting emissions from factories, power plants, cars, and other sources, and, of course, disposing of waste improperly.⁷ The most vulnerable groups, such as the

³ *Chemical pollution – the next global crisis* (no date) *World Bank Blogs*. Available at: <https://blogs.worldbank.org/en/climatechange/chemical-pollution-next-global-crisis> (Accessed: 27 April 2024); *10 chemicals of public health concern* (no date). Available at: <https://www.who.int/news-room/photo-story/photo-story-detail/10-chemicals-of-public-health-concern> (Accessed: 27 April 2024); Pathak, V.M. *et al.* (2022) 'Current status of pesticide effects on environment, human health and it's eco-friendly management as bioremediation: A comprehensive review', *Frontiers in Microbiology*, 13, p. 962619. Available at: <https://doi.org/10.3389/fmicb.2022.962619>; US EPA, O. (2014) *Persistent Organic Pollutants: A Global Issue, A Global Response*. Available at: <https://www.epa.gov/international-cooperation/persistent-organic-pollutants-global-issue-global-response> (Accessed: 27 April 2024); 'Living healthily in a chemical world – European Environment Agency' (no date). Available at: <https://www.eea.europa.eu/signals-archived/signals-2020/articles/living-healthily-in-a-chemical-world> (Accessed: 27 April 2024).

⁴ *UN experts urge States to address human rights impact of nuclear testing* (no date) *OHCHR*. Available at: <https://www.ohchr.org/en/press-releases/2024/03/un-experts-urge-states-address-human-rights-impact-nuclear-testing> (Accessed: 27 April 2024).

⁵ *About human rights and the environment* (no date) *OHCHR*. Available at: <https://www.ohchr.org/en/special-procedures/sr-environment/about-human-rights-and-environment> (Accessed: 27 April 2024).

⁶ *Ibid.*

⁷ *About toxics and human rights* (no date) *OHCHR*. Available at: <https://www.ohchr.org/en/special-procedures/sr-toxics-and-human-rights/about-toxics-and-human-rights> (Accessed: 27 April 2024); see also

working class, minorities, indigenous peoples, and those living in poverty, are frequently impacted by exposure to poisonous and other dangerous substances.⁸ Cases of hazardous exposure typically include women's and children's rights.⁹ There is a need to come up with ways of holding these corporations accountable through such principles as the 'polluter pays' principle. This must be done within a well-established legal framework.

This paper critically discusses the adverse effects that toxic chemicals have on human rights and all the associated aspects. It highlights the adequacy of and the challenges that arise in implementation legal and policy instruments that are geared towards addressing this form of pollution, both internationally and in Kenya, for sustainability.

2. Definition and Forms of Chemical Pollution

The Environmental Management and Co-ordination Act, 1999¹⁰ (EMCA) defines "chemical" to mean a chemical substance in any form whether by itself or in a mixture or preparation, whether manufactured or derived from nature and for the purposes of this Act includes industrial chemicals, pesticides, fertilizers and drugs.¹¹ EMCA also defines "hazardous substance" to mean any chemical, waste, gas, medicine, drug, plant, animal or microorganism which is likely to be injurious to human health or the environment.¹² "Hazardous waste" means any waste which has been determined by the Authority to be hazardous waste or to belong to any other category of waste provided for in section 91 under EMCA.

Exposure to highly hazardous pesticides: a major public health concern (no date). Available at: <https://www.who.int/publications-detail-redirect/WHO-CED-PHE-EPE-19.4.6> (Accessed: 27 April 2024).

⁸ *About toxics and human rights* (no date) OHCHR. Available at: <https://www.ohchr.org/en/special-procedures/sr-toxics-and-human-rights/about-toxics-and-human-rights> (Accessed: 27 April 2024).

⁹ Ibid.

¹⁰ Environmental Management and Co-ordination Act, No. 8 of 1999, Laws of Kenya.

¹¹ S. 2, EMCA.

¹² S. 2, EMCA.

Addressing Chemical Pollution in Kenya for Sustainability

Under EMCA "pollutant" includes any substance whether liquid, solid or gaseous which— may directly or indirectly alter the quality of any element of the receiving environment; is hazardous or potentially hazardous to human health or the environment; and includes objectionable odours, radio-activity, noise, temperature change or physical, chemical or biological change to any segment or element of the environment.¹³

EMCA also defines "waste" to include any matter prescribed to be waste and any matter whether liquid, solid, gaseous or radioactive, which is discharged, emitted or deposited in the environment in such volume, composition or manner likely to cause an alteration of the environment.¹⁴

The term "chemical pollution" refers to the growing amount of contaminants, particularly synthetic ones, in our surroundings.¹⁵ We come into contact with man-made chemicals virtually wherever we go in our daily lives, including in the food, drink, and air we breathe. It should come as no surprise that some of them can spread to our surroundings given their extensive existence in our globe.¹⁶ Chemical pollution is also defined as the presence of chemicals in our environment that are either naturally occurring or present in amounts that are higher than their background values.¹⁷ Most synthetic chemicals that end up in the environment are a result of numerous human activities that include using harmful compounds for different goals.¹⁸

¹³ S. 2, EMCA.

¹⁴ S. 2, EMCA.

¹⁵ *What is chemical pollution? The impact on the environment - Airly WP | Air Quality Monitoring. Monitor in UK & Europe. Airly Data Platform and Monitors* (no date). Available at: <https://airly.org/en/what-is-chemical-pollution/> (Accessed: 28 April 2024).

¹⁶ Ibid.

¹⁷ Sharma, K. (2023) *Chemical Pollution: Definition, Causes, Effects, Prevention*. Available at: <https://scienceinfo.com/chemical-pollution-causes-effects-prevention/> (Accessed: 28 April 2024).

¹⁸ Ibid.

Both radioactive and chemical pollutants can damage DNA and induce mutations that, if they appear in the germ line, can be passed down to subsequent generations.¹⁹

In general, pollutants may be divided into two main groups. Even if, in most cases, there are other categories based on their presence in nature, they will fall into one of these two groups upon serious analysis.²⁰ They are contaminants, both man-made and natural. They might also be referred to as qualitative and quantitative pollutants, respectively.²¹ Because the chemicals that contaminate all three resources are interconnected, there is a linkage between pollution of the air, water, and land.²²

3. International and Regional Legislative Framework on Chemical Pollution Control

While advanced countries often have highly established procedures in place to register pesticides and regulate their sale and usage, this is not always the case in other regions.²³ Therefore, international organisations and international treaties provide guidelines and legal frameworks on the use, management, and sale of pesticides, including HHPs, as well as on correct storage and handling (as well as for other potentially hazardous chemicals); they should be enforced internationally.²⁴

¹⁹ Aleström, P. and Winther-Larsen, H.C. (2016) '7 - Zebrafish offer aquaculture research their services', in S. MacKenzie and S. Jentoft (eds) *Genomics in Aquaculture*. San Diego: Academic Press, pp. 165–194. Available at: <https://doi.org/10.1016/B978-0-12-801418-9.00007-X>.

²⁰ Ajibade, F.O., Adelodun, B., Lasisi, K.H., Fadare, O.O., Ajibade, T.F., Nwogwu, N.A., Sulaymon, I.D., Ugya, A.Y., Wang, H.C. and Wang, A., 2021. Environmental pollution and their socioeconomic impacts. In *Microbe mediated remediation of environmental contaminants* (pp. 321-354). Woodhead Publishing.

²¹ Ibid.

²² Ibid., p. 328.

²³ *Exposure to highly hazardous pesticides: a major public health concern* (no date). Available at: <https://www.who.int/publications-detail-redirect/WHO-CED-PHE-EPE-19.4.6> (Accessed: 27 April 2024).

²⁴ Ibid.

3.1. International Convention On Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996

The *International Convention On Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996*²⁵ applies exclusively: to any damage caused in the territory, including the territorial sea, of a State Party; to damage by contamination of the environment caused in the exclusive economic zone of a State Party, established in accordance with international law, or, if a State Party has not established such a zone, in an area beyond and adjacent to the territorial sea of that State determined by that State in accordance with international law and extending not more than 200 nautical miles from the baselines from which the breadth of its territorial sea is measured; to damage, other than damage by contamination of the environment, caused outside the territory, including the territorial sea, of any State, if this damage has been caused by a substance carried on board a ship registered in a State Party or, in the case of an unregistered ship, on board a ship entitled to fly the flag of a State Party; and to preventive measures, wherever taken.²⁶ This Convention applies to claims, other than claims arising out of any contract for the carriage of goods and passengers, for damage arising from the carriage of hazardous and noxious substances by sea.²⁷

3.2. International Convention On the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972

Article 1 of the *International Convention On the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972*²⁸ provides that Contracting Parties shall individually and

²⁵ International Maritime Organization, *International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996* (May 3, 1996), IUCN (ID: ANA-062010).

²⁶ Article 3.

²⁷ Article 4(1).

²⁸ United Nations, *International Convention On the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972*, 1046 UNTS 120, [ATS] 1985 16, 11 ILM 1294 (1972), UKTS 43 (1976).

collectively promote the effective control of all sources of pollution of the marine environment, and pledge themselves especially to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea. Under Article 2, Contracting Parties are required to, as provided for in the following Articles, take effective measures individually, according to their scientific, technical and economic capabilities, and collectively, to prevent marine pollution caused by dumping and shall harmonize their policies in this regard.

3.3. Convention Relating to Civil Liability in The Field of Maritime Carriage of Nuclear Material, 1971

Under Article 1 of the *Convention Relating to Civil Liability in The Field of Maritime Carriage of Nuclear Material, 1971*²⁹, any person who by virtue of an international convention or national law applicable in the field of maritime transport might be held liable for damage caused by a nuclear incident shall be exonerated from such liability: if the operator of a nuclear installation is liable for such damage under either the Paris or the Vienna Convention, or if the operator of a nuclear installation is liable for such damage by virtue of a national law governing the liability for such damage, provided that such law is in all respects as favourable to persons who may suffer damage as either the Paris or the Vienna Convention.³⁰

²⁹ United Nations, *Convention Relating to Civil Liability in The Field of Maritime Carriage of Nuclear Material, 1971*, Adoption: 17 December 1971; Entry into force: 15 July 1975.

³⁰ *Ibid*, Article 1.

3.4. International Convention On Civil Liability for Oil Pollution Damage, 1969

Under Article 2 of the *International Convention On Civil Liability for Oil Pollution Damage, 1969*³¹, this Convention is to apply exclusively to pollution damage caused on the territory including the territorial sea of a Contracting State and to preventive measures taken to prevent or minimize such damage.³²

3.5. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998

Under Article 1 of the *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998*³³, the objective of this Convention is to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties.³⁴

³¹ United Nations, *International Convention On Civil Liability for Oil Pollution Damage, 1969*, Adoption: 29 November 1969; Entry into force: 19 June 1975; Being replaced by 1992 Protocol: Adoption: 27 November 1992; Entry into force: 30 May 1996.

³² *Ibid.*, Article 2.

³³ United Nations, *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, Rotterdam, 10 September 1998, United Nations, Treaty Series, vol. 2244, p. 337; C.N.846. 2002.TREATIES-8 of 20 August 2002.

³⁴ *Ibid.*, Article 1.

3.6. Stockholm Convention on Persistent Organic Pollutants, 2001

As per Article 1 of the *Stockholm Convention on Persistent Organic Pollutants, 2001*³⁵, mindful of the precautionary approach as set forth in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Convention is to protect human health and the environment from persistent organic pollutants.³⁶

3.7. Vienna Convention for The Protection of Ozone Layer, 1985

Under Article 2(1) of the *Vienna Convention for The Protection of Ozone Layer, 1985*³⁷, the Parties to this Convention are required to take appropriate measures in accordance with the provisions of this Convention and of those protocols in force to which they are party to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer.³⁸

3.8. Basel Convention On the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989

Under Article 1 on the scope of the *Basel Convention On the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989*³⁹, the following wastes that are subject to transboundary movement shall be “hazardous wastes” for the purposes of this Convention: wastes that belong to any category contained in Annex I, unless they do not

³⁵ United Nations, *Stockholm Convention On Persistent Organic Pollutants, 2001*, The Convention was adopted on 22 May 2001 at the Conference of Plenipotentiaries on the *Stockholm Convention on Persistent Organic Pollutants, Stockholm, 22-23 May 2001*.

³⁶ *Ibid.*, Article 1.

³⁷ United Nations, *Vienna Convention for The Protection of Ozone Layer, 1985*, 1513 UNTS 293, 26 ILM 1529 (1987), [1988] ATS 26.

³⁸ *Ibid.*, Article 1.

³⁹ United Nations, *Basel Convention On the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989*, United Nations, Treaty Series, vol. 1673, p. 57; and depositary notifications C.N.302.1992.TREATIES-9 of 25 November 1992.

possess any of the characteristics contained in Annex III; and wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit; wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be “other wastes” for the purposes of this Convention; wastes which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials, are excluded from the scope of this Convention; and wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, are excluded from the scope of this Convention.⁴⁰

Under Article 4(1), Parties exercising their right to prohibit the import of hazardous wastes or other wastes for disposal shall inform the other Parties of their decision pursuant to Article 13. In addition, Parties shall prohibit or shall not permit the export of hazardous wastes and other wastes to the Parties which have prohibited the import of such wastes, when notified pursuant to subparagraph (a) above.⁴¹

3.9. Bamako Convention On the Ban of the Import into Africa and The Control of TransBoundary Movement and Management of Hazardous Wastes Within Africa, 1991

Under Article 1 of the *Bamako Convention On the Ban of the Import into Africa and The Control of TransBoundary Movement and Management of Hazardous Wastes Within Africa, 1991*⁴², the following substances are considered "hazardous wastes" for the purposes of this convention: (a) Wastes that belong to any category contained in Annex I of this

⁴⁰ Ibid., Article 1.

⁴¹ Ibid., Article 4.

⁴² African Union, *Bamako Convention On the Ban of the Import into Africa and The Control of TransBoundary Movement and Management of Hazardous Wastes Within Africa, 1991*, 22 April 1998, in accordance with article 25.

Convention; (b) Wastes that are not covered under paragraph (a) above but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the State of export, import or transit; (c) Wastes which possess any of the characteristics contained in Annex II of this Convention; (d) Hazardous substances which have been banned, cancelled or refused registration by government regulatory action, or voluntarily withdrawn from registration in the country of manufacture, for human health or environmental reasons; wastes which, as a result of being radioactive, are subject to any international control systems, including international instruments, applying specifically to radioactive materials, are included in the scope of this Convention; and wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, shall not fall within the scope of this Convention.⁴³

3.10. Treaty Establishing Common Market for Eastern and Southern Africa

The *Treaty Establishing Common Market for Eastern and Southern Africa 1993*⁴⁴ establishes a Common Market for Eastern and Southern Africa. Article 100 of the Treaty on Strategy and Priority Areas provides that for the purposes of Article 99 of this Treaty, the Member States undertake to formulate an industrial strategy aimed at, *inter alia*: the rehabilitation, maintenance and upgrading of agro-industries and the metallurgical, engineering, chemical and building materials industries.⁴⁵ Article 124(2) provides that for the purposes of paragraph 1 of this Article, the Member States undertake to, *inter alia*: adopt common environmental control regulations, incentives and standards; develop capabilities for the assessment of all forms of environmental degradation and pollution and the formulation of regional solutions; encourage the manufacture and use of biodegradable pesticides, herbicides and packaging materials; discourage the excessive use of agricultural

⁴³ Ibid., Article 1.

⁴⁴ African Union, *Treaty Establishing Common Market for Eastern and Southern Africa 1993*, Adopted: November 5, 1993 [Kampala]. Entry into force: December 8, 1994.

⁴⁵ Article 100(k).

chemicals and fertilizers; adopt sound land management techniques for the control of soil erosion, desertification and bush encroachment; promote the use of ozone and environmental friendly chemicals; promote the utilisation and strengthen the facilities of training and research institutions within the Common Market; adopt common standards for the control of atmospheric industrial and water pollution arising from urban and industrial development activities; exchange information on atmospheric, industrial and other forms of pollution and conservation technology; adopt common regulations for the management of shared natural resources; and adopt community environmental management criteria.⁴⁶

3.11. Treaty Establishing East African Community

Article 108 of the *Treaty Establishing East African Community 1999*⁴⁷ provides that the Partner States shall: harmonise policies, legislation and regulations for enforcement of pests and disease control; harmonise and strengthen regulatory institutions; harmonise and strengthen zoo-sanitary and phyto- sanitary services inspection and certification; establish regional zoo-sanitary and phyto-sanitary laboratories to deal with diagnosis and identification of pests and diseases; adopt common mechanism to ensure safety, efficacy and potency of agricultural inputs including chemicals, drugs and vaccines; and co-operate in surveillance, diagnosis and control strategies of trans-boundary pests and animal diseases.⁴⁸ Article 112(1) provides that for purposes of Article 111 of this Treaty, the Partner States undertake to co-operate in the management of the environment and agree to: develop a common environmental management policy that would sustain the eco-systems of the Partner States, prevent, arrest and reverse the effects of environmental degradation; develop special environmental management strategies to manage fragile

⁴⁶ Article 124(2)

⁴⁷ African Union, *Treaty Establishing East African Community 1999*, Entry into force: July 7, 2000.

⁴⁸ Article 108.

Addressing Chemical Pollution in Kenya for Sustainability

ecosystems, terrestrial and marine resources, noxious emissions and toxic and hazardous chemicals; take measures to control trans-boundary air, land and water pollution arising from developmental activities; take necessary disaster preparedness, management, protection and mitigation measures especially for the control of natural and man-made disasters. These include oil spills, bio-hazards, floods, earthquakes, marine accidents, drought and bush fires; and integrate environmental management and conservation measures in all developmental activities such as trade, transport, agriculture, industrial development, mining and tourism in the Community.⁴⁹

Article 113 provides that the Partner States undertake to co-operate and adopt common positions against illegal dumping of toxic chemicals, substances and hazardous wastes within the Community from either a Partner State or any third party; the Partner States shall harmonise their legal and regulatory framework for the management, movement, utilisation and disposal of toxic substances; and the Partner States undertake to ratify or accede to international environmental conventions that are designed to improve environmental policies and management.⁵⁰

The international and regional instruments are important in setting the minimum standards upon which Party States can base their domestic laws when it comes to chemical pollution control.

⁴⁹ Article 112.

⁵⁰ Article 113.

4. Legislative Framework on Chemical Pollution Control in Kenya

4.1. The Constitution of Kenya 2010

According to Article 42 of the 2010 Kenyan Constitution⁵¹, every individual is guaranteed the right to a clean and healthy environment.⁵² This includes the right to have environmental obligations under Article 70 fulfilled and the environment protected for the benefit of current and future generations through legislative and other measures, especially those mentioned in Article 69.⁵³

In addition, Article 43(1) guarantees that every person has the right, *inter alia*—to the highest attainable standard of health, which includes the right to health care services, including reproductive health care; to accessible and adequate housing, and to reasonable standards of sanitation; to be free from hunger, and to have adequate food of acceptable quality; and to clean and safe water in adequate quantities.⁵⁴

Regarding consumer protection from harmful goods and services, Article 46 (1) provides that consumers have the right—to goods and services of reasonable quality; to the information necessary for them to gain full benefit from goods and services; to the protection of their health, safety, and economic interests; and to compensation for loss or injury arising from defects in goods or services.⁵⁵

The Constitution also obligates the State to, *inter alia*: ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits; establish systems of environmental

⁵¹ Constitution of Kenya 2010 (Republic of Kenya, 2010, Nairobi). Available at <http://www.kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=Const2010>

⁵² Art. 42, Constitution of Kenya 2010 (Republic of Kenya, 2010, Nairobi).

⁵³ Ibid.

⁵⁴ Article 43(1), Constitution of Kenya 2010.

⁵⁵ Article 46(1),ibid.

impact assessment, environmental audit and monitoring of the environment; and eliminate processes and activities that are likely to endanger the environment.⁵⁶

In addition to any other available legal remedies, a person may apply to a court for redress if they believe that their right to a clean and healthy environment—which is recognised and protected under Article 42—has been, is being, or is likely to be denied, violated, infringed, or threatened.⁵⁷ When a request is made under clause (1), the court has the authority to issue any directives or orders that it deems necessary in order to protect the environment, compel public officials to take action to prevent or stop environmentally harmful acts or omissions, or compensate anyone who has been harmed by a violation of their right to a clean and healthy environment.⁵⁸

4.2. Environmental Management and Co-ordination Act, 1999

The Environmental Management and Co-ordination Act, 1999⁵⁹ (EMCA) provides for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto.⁶⁰ Section 3 of EMCA adopts the provisions of Articles 42 and 70 of the Constitution. Section 3(5) requires that in exercising the jurisdiction conferred upon it under subsection (3), the Environment and Land Court should be guided by the following principles of sustainable development—the principle of public participation in the development of policies, plans and processes for the management of the environment; the cultural and social principles traditionally applied by any community in Kenya for the management of the environment or natural resources in so far as the same are relevant and are not repugnant to justice and morality or inconsistent with any written law; the principle of international

⁵⁶ Article 69(1), *ibid.*

⁵⁷ Article 70(1), *ibid.*

⁵⁸ Article 70(2), *ibid.*

⁵⁹ Environmental Management and Co-ordination Act, No. 8 of 1999, Laws of Kenya.

⁶⁰ *Ibid.*, preamble.

co-operation in the management of environmental resources shared by two or more states; the principles of intergenerational and intragenerational equity; the polluter-pays principle; and the pre-cautionary principle.⁶¹

Section 92 of EMCA provides for regulations of toxic and hazardous materials, among others, where it provides that the Cabinet Secretary may, on the advice of the Authority make regulations prescribing the procedure and criteria for—classification of toxic and hazardous chemicals and materials in accordance with their toxicity and the hazard they present to the human health and to the environment; registration of chemicals and materials; labelling of chemicals and materials; packaging for chemicals and materials; advertising of chemicals and materials; control of imports and exports of toxic and hazardous chemicals and materials permitted to be so imported or exported; distribution, storage, transportation and handling of chemicals and materials; monitoring of the effect of chemicals and their residue on human health and the environment; disposal of expired and surplus chemicals and materials; and restriction and banning of toxic and hazardous substances and energy.⁶²

Section 93 provides for the prohibition of discharge of hazardous substances, chemicals and materials or oil into the environment and spiller's liability. Section 94 provides for standards of pesticides and toxic substances. Section 97 provides for registration of pesticides and toxic substances. Section 98 provides for offences relating to pesticides and toxic substances and states that no person should—detach, alter or destroy any labelling on a pesticide or toxic substance contrary to the provisions of this Act; change the composition of a pesticide or toxic substance, contrary to the provisions of this Act; or

⁶¹ S. 3(5), EMCA.

⁶² S. 92, EMCA.

Addressing Chemical Pollution in Kenya for Sustainability

use or dispose into the environment a pesticide or toxic substance in contravention of the provisions of this Act.⁶³

Under section 99, any pesticide or toxic substance which the Authority reasonably suspects to be the subject matter of an offence under this Act shall be liable to seizure by the Authority. Under section 100, the Cabinet Secretary is, in consultation with the relevant lead agencies, to make regulations prescribing the contents of any application and the conditions for the registration of pesticides and toxic substances under this Act.

Section 141 of the Act provides for offences relating to hazardous wastes, materials, chemicals and radioactive substances. Section 142 provides for offences relating to pollution and makes it an offence for any person to discharge any dangerous materials, substances, oil, oil mixtures into land, water, air, or aquatic environment contrary to the provisions of this Act; or pollute the environment contrary to the provisions of this Act.⁶⁴

The Second Schedule to EMCA provides projects requiring submission of an Environmental Impact Assessment Study Report and outlines all activities dealing with chemicals and industries dealing with such chemicals and other substances likely to cause chemical pollution as envisaged under section 58 of EMCA.⁶⁵

These provisions lay out the overarching legal framework which should inform other sectoral laws that deal with the chemicals in question and their derivatives.

Other related regulations under the Act that regulate toxic chemicals and waste sector include: Environmental Management and Co-ordination (Waste Management)

⁶³ S. 98, EMCA.

⁶⁴ S. 142, EMCA.

⁶⁵ Second schedule, EMCA.

Addressing Chemical Pollution in Kenya for Sustainability

Regulations, 2006;⁶⁶ Environmental (Impact Assessment and Audit) Regulations, 2003;⁶⁷ Environmental (Prevention of Pollution in Coastal Zone and Other Segments of the Environment) Regulation;⁶⁸ Environmental Management and Co-ordination (Water Quality) Regulations;⁶⁹ Environmental Management and Co-ordination (Controlled Substances) Regulations;⁷⁰ Environmental Management and Co-ordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations;⁷¹ Environmental Management and Co-ordination (Air Quality) Regulations;⁷² and Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations⁷³.

These regulations and the Act are to be applied in a complementary manner in order to cover all sectors that deal or interact with potentially toxic chemicals.

4.3. The Food, Drugs and Chemical Substances Act, Cap 254

The Food, Drugs and Chemical Substances Act⁷⁴ makes provision for the prevention of adulteration of food, drugs and chemical substances and for matters incidental thereto and connected therewith.⁷⁵ The Act defines "chemical substance" to mean any substance

⁶⁶ Environmental Management and Co-ordination (Waste Management) Regulations, Legal Notice 121 of 2006.

⁶⁷ Environmental (Impact Assessment and Audit) Regulations, Legal Notice 101 of 2003, Legal Notice 133 of 2007, Legal Notice 30 of 2009, Legal Notice 32 of 2019].

⁶⁸ Environmental (Prevention of Pollution in Coastal Zone and other Segments of the Environment) Regulations, Legal Notice 159 of 2003.

⁶⁹ Environmental Management and Co-ordination (Water Quality) Regulations, Legal Notice 120 of 2006, Legal Notice 85 of 2012.

⁷⁰ Environmental Management and Co-ordination (Controlled Substances) Regulations, Legal Notice 73 of 2007.

⁷¹ Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, Legal Notice 19 of 2009.

⁷² Environmental Management and Co-ordination (Air Quality) Regulations, Legal Notice 34 of 2014.

⁷³ Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, Legal Notice 160 of 2006.

⁷⁴ Food, Drugs and Chemical Substances Act, CAP 254, Laws of Kenya.

⁷⁵ Ibid., Preamble.

or mixture of substances prepared, sold or represented for use as—a germicide; an antiseptic; a disinfectant; a pesticide; an insecticide; a rodenticide; a vermicide; or a detergent, or any other substance or mixture or substances which the Cabinet Secretary may, after consultation with the Board, declare to be a chemical substance.⁷⁶ Section 3 of the Act provides for prohibition against sale of unwholesome, poisonous or adulterated food.

Section 20 provides that any person who sells any chemical substance that—is adulterated; or consists in whole or in part of any filthy, putrid, disgusting, rotten, decomposed or diseased substance or foreign matter, shall be guilty of an offence. Section 22 provides that where a standard has been prescribed for a chemical substance, any person who labels, packages, sells or advertises any other substance in such a manner that it is likely to be mistaken for that chemical substance shall be guilty of an offence unless the substance complies with the prescribed standard for such chemical substance.

Under section 24, any person who uses or disposes of any chemical substance in a manner likely to cause contamination of food or water for human consumption or in a manner liable to be injurious or dangerous to the health of any person shall be guilty of an offence.

Under section 27, the Act establishes the Public Health (Standards) Board mandated with enforcing the Act. Under section 28, the Cabinet Secretary may make regulations to enforce the Act.⁷⁷

4.4. The Fertilizers and Animal Foodstuffs Act, Cap 345

the Fertilizers and Animal Foodstuffs Act⁷⁸ is an Act of Parliament to regulate the importation, manufacture and sale of agricultural fertilizers and animal foodstuffs and

⁷⁶ S. 2, Food, Drugs and Chemical Substances Act, CAP 254.

⁷⁷ See the Food, Drugs and Chemical Substances (Food Hygiene) Regulations, 1978.

⁷⁸ Fertilizers and Animal Foodstuffs Act, CAP 345, Laws of Kenya.

substances of animal origin intended for the manufacture of such fertilizers and foodstuffs, and to provide for matters incidental to and connected with the foregoing.⁷⁹

Section 2A establishes the Fertilizer and Animal Foodstuffs Board of Kenya which is mandated with regulating the fertilizers and animal foodstuffs industry in Kenya including the production, manufacture, packaging, importation and marketing of fertilizers and animal foodstuffs and importation of raw materials for the manufacture of animal foodstuffs, among others.

Section 3(1) provides that no person shall import, manufacture, compound, mix or sell any fertilizer or animal foodstuff other than a substance declared by rule made under section 19 of this Act to be an approved fertilizer or an approved animal foodstuff, as the case may be.

Under section 19, the Cabinet Secretary on recommendation of the Board may make rules generally for the better carrying out of the purposes and provisions of this Act.⁸⁰

4.5. The Occupational Safety and Health Act, Cap 236A

The Occupational Safety and Health Act⁸¹ provides for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.⁸²

⁷⁹ Ibid., preamble.

⁸⁰ See Fertilizers and Animal Foodstuffs (Analysis) Rules; Fertilizers and Animal Foodstuffs (Approved Animal Foodstuffs) Rules; Fertilizers and Animal Foodstuffs (Approved Fertilizers) Rules; Fertilizers and Animal Foodstuffs (Declaration and Warranty) Rules; Fertilizers and Animal Foodstuffs (Packing of Approved Animal Foodstuffs) Rules; Fertilizers and Animal Foodstuffs (Packing of Approved Fertilizers) Rules; Fertilizers and Animal Foodstuffs (Records and Returns) Rules; Fertilizers and Animal Foodstuffs (Sampling) Rules; Fertilizers and Animal Foodstuffs (Sterilization of Bones) Rules; and Fertilizers and Animal Foodstuffs (Importation and Use of Meat and Bone Meal) (Prohibition) Regulations.

⁸¹ Occupational Safety and Health Act, Cap 236A, Laws of Kenya.

⁸² Ibid., preamble.

Section 83 makes provision for the handling, transportation and disposal of chemicals and other hazardous substances. Section 84 makes provision for material safety data sheets. The Act also makes provision for labelling and marking;⁸³ classification of hazardous chemicals and substances;⁸⁴ corrosive substances;⁸⁵ exposure limits to hazardous substances;⁸⁶ control of air pollution, noise and vibration;⁸⁷ and redeployment on medical advice⁸⁸.

4.6. The Biosafety Act, Cap 320

The Biosafety Act⁸⁹ was enacted to regulate activities in genetically modified organisms, to establish the National Biosafety Authority, and for connected purposes.⁹⁰ The objects of this Act are—to facilitate responsible research into, and minimize the risks that may be posed by, genetically modified organisms; to ensure an adequate level of protection for the safe transfer, handling and use of genetically modified organisms that may have an adverse effect on the health of the people and the environment; and to establish a transparent, science-based and predictable process for reviewing and making decisions on the transfer, handling and use of genetically modified organisms and related activities.⁹¹

The Act also establishes the National Biosafety Authority whose object and purpose is to exercise general supervision and control over the transfer, handling and use of genetically

⁸³ S. 85.

⁸⁴ S. 86.

⁸⁵ S. 87.

⁸⁶ S. 88.

⁸⁷ S. 89.

⁸⁸ S. 90.

⁸⁹ Biosafety Act, Cap 320, Laws of Kenya.

⁹⁰ *Ibid.*, preamble.

⁹¹ *Ibid.*, s. 4.

modified organisms with a view to ensuring—safety of human and animal health; provision of an adequate level of protection of the environment.⁹²

4.7. The Public Health Act, Cap 242

The Public Health Act⁹³ is an Act of Parliament to make provision for securing and maintaining health.⁹⁴ The Act establishes a Central Board of Health whose function is to advise the Cabinet Secretary upon all matters affecting the public health, and particularly upon all matters mentioned in subsection (2) of section 10^{95, 96}.

Generally, the Act seeks to protect public health through safeguarding food and water resources for safe human consumption.

4.8. The Nuclear Regulatory Act, Cap 243

The Nuclear Regulatory Act⁹⁷ was enacted to provide for a comprehensive framework for the regulation of safe, secure and peaceful utilization of atomic energy and nuclear technology; the production and use of radiation sources and the management of

⁹² Ibid., S. 7(1).

⁹³ Public Health Act, Cap 242, Laws of Kenya.

⁹⁴ Ibid., preamble.

⁹⁵ 10 (2) The functions of the Medical Department shall be, subject to the provisions of this Act, to prevent and guard against the introduction of infectious disease into Kenya from outside; to promote the public health and the prevention, limitation or suppression of infectious, communicable or preventable disease within Kenya; to advise and direct local authorities in regard to matters affecting the public health; to promote or carry out researches and investigations in connexion with the prevention or treatment of human diseases; to prepare and publish reports and statistical or other information relative to the public health; and generally to carry out in accordance with directions the powers and duties in relation to the public health conferred or imposed by this Act.

(3) It shall be the duty of the department to obtain and publish periodically such information regarding infectious disease and other health matter in Kenya, and such procurable information regarding epidemic disease in territories adjacent to Kenya or in other countries, as the interests of the public health may require.

⁹⁶ Public Health Act, s. 3 and 8.

⁹⁷ Nuclear Regulatory Act, Cap 243, Laws of Kenya.

radioactive waste; the repeal of the Radiation Protection Act and for connected purposes.⁹⁸

The objects and purposes of this Act are to—regulate the safe, secure and peaceful development, production, possession, use, storage, transport, transfer, disposal or handling of nuclear and radioactive materials, activities and facilities and other apparatus generating radiation; and protect persons, property and the environment in relation to nuclear and radioactive material, activities and facilities and other apparatus generating ionizing radiation.⁹⁹

The Act establishes the Kenya Nuclear Regulatory Authority whose objects and functions of the Authority shall be to—ensure the safe, secure and peaceful use of nuclear science and technology; provide for the protection of persons, property and the environment against the harmful effects of ionizing radiation through the establishment of a system of regulatory control; exercise regulatory control over—(i) siting, design construction, operation, manufacture of component parts and decommissioning of facilities; (ii) nuclear and radioactive materials and facilities; and (iii) such other activities as may, with the prior approval of the National Assembly, be prescribed which the Authority may seek to exercise regulatory control over; ensure compliance with the conditions of authorization through the implementation of a system of inspections and enforcement; co-ordinate the fulfillment of national obligations in respect of nuclear safety, security and safeguards; co-operate with any relevant international agency by providing any assistance or information required; establish appropriate awareness methods and procedures for informing and consulting the public and other interested parties about the regulatory process and the safety, health and environmental aspect of regulated activities

⁹⁸ Ibid., preamble.

⁹⁹ Ibid., S. 3.

including incidents, accidents and abnormal occurrences; and perform any other functions as may be provided for in this Act.¹⁰⁰

The Authority is required to—establish a system of control over radiation sources to ensure they are safely managed and securely protected during and at the end of their useful lives; and prescribe a categorization of sources based on the potential injury to people and the environment.¹⁰¹

The foregoing statutes, regulations and institutions are mandated to protect the environment and human health through regulation of various sources of toxic chemicals pollution. They are all expected to work in collaboration while enforcing their respective regulatory frameworks as well as the international legal instruments on control of toxic chemicals pollution.

5. Toxic Chemicals and Their Impact on Human Rights

Even though artificial and anthropogenic chemicals have greatly benefited human civilization—for example, by reducing disease and increasing food production—their advantages are currently being outweighed by equally significant drawbacks brought on by accidental exposure to humans and the environment as well as subtle toxicity.¹⁰² Currently, there are hundreds of thousands of man-made compounds, by-products, metabolites, and abiotically generated transformation products.¹⁰³ As a result, both people and wildlife are subjected to complicated mixtures—never just one chemical at a

¹⁰⁰ Ibid., S. 6.

¹⁰¹ Ibid., S. 37.

¹⁰² Naidu, R., Biswas, B., Willett, I.R., Cribb, J., Singh, B.K., Nathanail, C.P., Coulon, F., Semple, K.T., Jones, K.C., Barclay, A. and Aitken, R.J., 2021. Chemical pollution: A growing peril and potential catastrophic risk to humanity. *Environment International*, 156, p.106616, p. 8.

¹⁰³ Drakvik, E., Altenburger, R., Aoki, Y., Backhaus, T., Bahadori, T., Barouki, R., Brack, W., Cronin, M.T., Demeneix, B., Bennekou, S.H. and van Klaveren, J., 2020. Statement on advancing the assessment of chemical mixtures and their risks for human health and the environment. *Environment international*, 134, p.105267.

time and never with a single, overpowering impact.¹⁰⁴ Therefore, it is imperative to devise methods for evaluating the cumulative effects of exposure to various dangerous substances.¹⁰⁵

In low- and middle-income countries (LMICs), environmental pollution—the contamination of air, water, and soil by human activity—is the leading cause of sickness and mortality.¹⁰⁶ According to World Health Organisation (WHO) estimates, pollution-related illnesses claim the lives of 8.9 million people annually, with 8.4 million (94%) of those deaths occurring in developing nations.¹⁰⁷ Globally, toxic chemicals are becoming a more significant source of pollution. They are found in the bodies of most individuals today, are utilised in a wide range of goods, and are widely distributed in the worldwide environment.¹⁰⁸ Many have never undergone sufficient safety testing and numerous disorders are associated with toxic substances.¹⁰⁹

In LMICs, chemical contamination is rising quickly. Globalization is a major factor driving this trend in the chemical production, recycling, and other polluting industries.¹¹⁰ These businesses are moving to developing nations where labour costs are cheap, environmental laws are rarely enforced, and public health facilities are few.¹¹¹ In LMICs, hazardous chemical exposure to workers and communities is growing, frequently in grossly unregulated environments.¹¹²

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

¹⁰⁶ Landrigan, P.J. and Fuller, R., 2015. Global health and environmental pollution. *International journal of public health*, 60, pp.761-762.

¹⁰⁷ Ibid.

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

¹¹⁰ Landrigan, P.J. and Fuller, R., 2015. Global health and environmental pollution. *International journal of public health*, 60, pp.761-762.

¹¹¹ Ibid.

¹¹² Ibid.

Addressing Chemical Pollution in Kenya for Sustainability

A historic resolution recognising that access to a clean, healthy, and sustainable environment is a fundamental right was adopted by the UN fundamental Rights Council on October 8.¹¹³ In the battle against the triple global catastrophes of pollution, biodiversity loss, and climate change, the Human Rights Council decision marks a turning point.¹¹⁴ In order to achieve a clean, healthy, and sustainable environment, persistent efforts must be made to prevent accidents, diseases, and injuries at work; implement a "just transition" strategy that avoids compromising the human right to a healthy environment with the right to work; and preserve biodiversity by assisting the livelihoods of indigenous peoples.¹¹⁵

The Human Rights Council acknowledged in resolution 51/35 that "toxic nuclear waste and nuclear radiation and contamination from decades ago continue to have an adverse impact on the human rights of the people of the Marshall Islands, including persons belonging to displaced communities" and that these issues affect a variety of the people's rights, such as the rights to life, health, food, housing, water, and a sustainable environment, as well as their rights to cultural rights and life.¹¹⁶

Arguably, chemical pollution interferes with the rights to life, health, food, housing, water, and a sustainable environment.¹¹⁷ The United Nations General Assembly

¹¹³ *Advancing the Right to a Healthy Environment* | UNEP - UN Environment Programme (no date). Available at: <https://www.unep.org/explore-topics/environmental-rights-and-governance/what-we-do/advancing-right-healthy-environment> (Accessed: 27 April 2024).

¹¹⁴ Ibid.

¹¹⁵ *UN General Assembly recognizes human right to a clean, healthy, and sustainable environment* | International Labour Organization (2022). Available at: <https://www.ilo.org/resource/article/un-general-assembly-recognizes-human-right-clean-healthy-and-sustainable> (Accessed: 27 April 2024).

¹¹⁶ *UN experts urge States to address human rights impact of nuclear testing* (no date) OHCHR. Available at: <https://www.ohchr.org/en/press-releases/2024/03/un-experts-urge-states-address-human-rights-impact-nuclear-testing> (Accessed: 27 April 2024).

¹¹⁷ Environment, U.N. (2021) *Human Rights and Hazardous Substances: Key Messages, UNEP - UN Environment Programme*. Available at: <http://www.unep.org/resources/report/human-rights-and-hazardous-substances-key-messages> (Accessed: 28 April 2024); 'Toxic Pollution Demands "Immediate, Ambitious Action" |

recognizes that sustainable development, in its three dimensions (social, economic and environmental), and the protection of the environment, including ecosystems, contribute to and promote human well-being and the full enjoyment of all human rights, for present and future generations.¹¹⁸ The Assembly also reaffirmed that States have the obligation to respect, protect and promote human rights, including in all actions undertaken to address environmental challenges, and to take measures to protect the human rights of all, as recognized in different international instruments, and that additional measures should be taken for those who are particularly vulnerable to environmental degradation, noting the framework principles on human rights and the environment.¹¹⁹

Along with climate change and the loss of natural areas, exposure to harmful chemicals shortens life expectancy and negatively affects human welfare.¹²⁰ Pollution is a significant barrier to eradicating poverty on a planet that is habitable.¹²¹

It is thus important that chemical pollutants, which have broad effects across all sectors, should be urgently addressed as part of efforts towards not only achieving sustainable development goals but also safeguarding the human rights of all persons.

6. Addressing Chemical Pollution in Kenya to Safeguard Human Rights

Two of the primary issues mentioned in Agenda 21 —especially for poor nations— are the absence of adequate scientific data for risk assessments and the scarcity of resources for

Human Rights Watch' (2022), 10 March. Available at: <https://www.hrw.org/news/2022/03/10/toxic-pollution-demands-immediate-ambitious-action> (Accessed: 28 April 2024).

¹¹⁸ United Nations, UNGA Resolution 76/300 - The human right to a clean, healthy and sustainable environment, *Seventy-sixth session Agenda item 74 (b), Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms*, Resolution adopted by the General Assembly on 28 July 2022. [without reference to a Main Committee (A/76/L.75 and A/76/L.75/Add.1)].

¹¹⁹ Ibid.

¹²⁰ *Chemicals and waste.. Sustainable Development Knowledge Platform* (no date). Available at: <https://sustainabledevelopment.un.org/topics/chemicalsandwaste> (Accessed: 27 April 2024).

¹²¹ Ibid.

Addressing Chemical Pollution in Kenya for Sustainability

chemical assessments for which data are available.¹²² While this may still be true for some of the developing nations due to other factors, the World Health Organization (WHO) has made impressive steps since adoption of Agenda 21 in providing this important data. According to WHO, through an evaluation procedure designed to produce a consensual scientific description of the dangers of chemical exposure, the health impacts of chemicals are ascertained.¹²³ Governments and national and international organisations can utilise these descriptions as the foundation for preventative measures against harmful effects on the environment and public health by publishing them in assessment reports and other relevant publications.¹²⁴ Chemicals utilised in the workplace are also covered, and information about them may be given in an easily digestible manner, especially those of significant public health concern, either individually or in combination.¹²⁵

These documents are frequently the starting point for developing policies and norms pertaining to the usage of chemicals as well as drinking water standards. They can also be employed in favour of pesticide control.¹²⁶ This is especially important considering that exposure to pesticide residues in food and perhaps drinking water can also occur as a consequence of environmental pollution.¹²⁷ Under the auspices of the Inter-

¹²² *Chemicals and waste.. Sustainable Development Knowledge Platform* (no date). Available at: <https://sustainabledevelopment.un.org/topics/chemicalsandwaste> (Accessed: 27 April 2024).

¹²³ *Providing information on the health effects of chemicals* (no date). Available at: <https://www.who.int/activities/providing-information-on-the-health-effects-of-chemicals> (Accessed: 27 April 2024).

¹²⁴ Ibid.

¹²⁵ Ibid.

¹²⁶ *Providing information on the health effects of chemicals* (no date). Available at: <https://www.who.int/activities/providing-information-on-the-health-effects-of-chemicals> (Accessed: 27 April 2024); for instance, see *The WHO recommended classification of pesticides by hazard and guidelines to classification, 2009 edition* (no date). Available at: <https://www.who.int/publications-detail-redirect/9789241547963> (Accessed: 27 April 2024); *The WHO Recommended Classification of Pesticides by Hazard and guidelines to classification, 2019 edition* (no date). Available at: <https://www.who.int/publications-detail-redirect/9789240005662> (Accessed: 27 April 2024).

¹²⁷ *Exposure to highly hazardous pesticides: a major public health concern* (no date). Available at: <https://www.who.int/publications-detail-redirect/WHO-CED-PHE-EPE-19.4.6> (Accessed: 27 April 2024);

Addressing Chemical Pollution in Kenya for Sustainability

Organizational Programme for the Sound Management of Chemicals (IOMC), WHO collaborates with other international organisations, including the Organisation for Economic Cooperation and Development (OECD), to minimise duplication and maximize the use of assessment resources.¹²⁸

The following three steps are some of the suggestions by the World Bank on what legislators may do to enhance chemical management: (a) determine what need management- Currently, there is no standardized method for quantifying chemical contamination. The World Bank has put forward rules for the gathering and examination of chemical samples from the surrounding environment or from locally grown products, as well as for the recycling of used lead acid batteries and small-scale artisanal gold mining.¹²⁹ To monitor chemicals in the environment and in humans, however, governments, academic institutions, and development partners must collaborate on international protocols;¹³⁰ (b) embrace the "precautionary principle," which calls for demonstrating a chemical's safety before usage- with this strategy, legislators must have a fair dosage of skepticism regarding novel compounds;¹³¹ and (c) implementing frameworks for policies based on evidence- strict environmental and safety regulations, holding polluters accountable, and the elimination of ecologically damaging subsidies— on which governments already spend trillions of dollars annually.¹³²

see also *Pesticide residues in food* (no date). Available at: <https://www.who.int/news-room/fact-sheets/detail/pesticide-residues-in-food> (Accessed: 27 April 2024).

¹²⁸ *Providing information on the health effects of chemicals* (no date). Available at: <https://www.who.int/activities/providing-information-on-the-health-effects-of-chemicals> (Accessed: 27 April 2024).

¹²⁹ *Chemical pollution – the next global crisis* (no date) *World Bank Blogs*. Available at: <https://blogs.worldbank.org/en/climatechange/chemical-pollution-next-global-crisis> (Accessed: 27 April 2024).

¹³⁰ *Ibid.*

¹³¹ *Ibid.*

¹³² *Ibid.*

The accumulation and concentration of contaminants in the food chain through absorption is rapidly accelerated by metabolic reactions, which frequently result in high levels of toxicity, making water pollution a serious health risk.¹³³ It would be beneficial to take into account both point and non-point causes of water pollution while controlling the contamination.¹³⁴

It is important to control and reduce non-point source water pollution using effective techniques.¹³⁵ There is also a need to employ effective and scientifically proven treatment technologies to reduce and control water contamination from point sources.¹³⁶

Air emissions are essentially endlessly numerous and random. Though it is seasonal in nature and not very effective, precipitation is the most well-known air purifier.¹³⁷ Effective pollution control and potential pollution emission are prerequisites for maintaining sustainable air quality. Controlling or preventing air pollution is expensive and technically challenging.¹³⁸ Notwithstanding, several approaches or strategies have

¹³³ Ajibade, F.O., Adelodun, B., Lasisi, K.H., Fadare, O.O., Ajibade, T.F., Nwogwu, N.A., Sulaymon, I.D., Ugya, A.Y., Wang, H.C. and Wang, A., 2021. Environmental pollution and their socioeconomic impacts. In *Microbe mediated remediation of environmental contaminants* (pp. 321-354). Woodhead Publishing, p. 336.

¹³⁴ Ibid.

¹³⁵ Ibid.; US EPA, O. (2015) *Basic Information about Nonpoint Source (NPS) Pollution*. Available at: <https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution> (Accessed: 28 April 2024); Read 'Watershed Management for Potable Water Supply: Assessing the New York City Strategy' at NAP.edu (no date). Available at: <https://doi.org/10.17226/9677>; Jain, C.K. and Singh, S. (2019) 'Best management practices for agricultural nonpoint source pollution: Policy interventions and way forward', *World Water Policy*, 5(2), pp. 207–228. Available at: <https://doi.org/10.1002/wwp2.12015>.

¹³⁶ Ajibade, F.O., Adelodun, B., Lasisi, K.H., Fadare, O.O., Ajibade, T.F., Nwogwu, N.A., Sulaymon, I.D., Ugya, A.Y., Wang, H.C. and Wang, A., 2021. Environmental pollution and their socioeconomic impacts. In *Microbe mediated remediation of environmental contaminants* (pp. 321-354), p. 336.

¹³⁷ Ibid., p. 337.

¹³⁸ Ibid., p. 337; see also Kjellstrom, T. *et al.* (2006) 'Air and Water Pollution: Burden and Strategies for Control', in D.T. Jamison *et al.* (eds) *Disease Control Priorities in Developing Countries*. 2nd edn. Washington (DC): The International Bank for Reconstruction and Development / The World Bank. Available at: <http://www.ncbi.nlm.nih.gov/books/NBK11769/> (Accessed: 28 April 2024); Sjöholm, P. *et al.* (2001) '13 - Gas-Cleaning Technology', in Howard Goodfellow and E. Tähti (eds) *Industrial Ventilation Design Guidebook*. San Diego: Academic Press, pp. 1197–1316. Available at: <https://doi.org/10.1016/B978-012289676-7/50016-3>;

been utilised and verified effective in managing air pollution, and the relevant parties have to contemplate their suitability in the context of Kenya.¹³⁹

Where the level of pollution is sufficiently higher than the advised standard, remediation or cleaning of the contaminated soil is required.¹⁴⁰ Excavating the contaminated soil and securely disposing of it in an authorized landfill (also known as "dig and dump") or removing it from the site (also known as ex situ remediation) are common methods used.¹⁴¹ Nevertheless, the use of in situ cleanup techniques has become widespread due to the high expense of trucking and landfilling.¹⁴²

The stakeholders should work closely with the other relevant government and private agencies towards coming up with the best approaches, while incorporating the latest scientific data in order to tackle chemical pollution in Kenya.

7. Conclusion

Chemical usage and manufacture are expanding globally, especially in developing countries.¹⁴³ The World Health Organization rightly argues that if responsible chemical management is not maintained, this is probably going to have a worsening effect on health.¹⁴⁴ It is very necessary to take multisectoral action to safeguard human health from

Krupnick, A.J. and Portney, P.R. (1991) 'Controlling Urban Air Pollution: A Benefit-Cost Assessment', *Science*, 252(5005), pp. 522–528.

¹³⁹ Ibid., p. 337.

¹⁴⁰ Ibid; Inglezakis, V.J. *et al.* (2016) 'Chapter 3 - Aquatic Environment', in Stavros G. Pouloupoulos and Vassilis J. Inglezakis (eds) *Environment and Development*. Amsterdam: Elsevier, pp. 137–212. Available at: <https://doi.org/10.1016/B978-0-444-62733-9.00003-4>.

¹⁴¹ Ibid.

¹⁴² Ibid; Liu, L. *et al.* (2018) 'Remediation techniques for heavy metal-contaminated soils: Principles and applicability', *Science of The Total Environment*, 633, pp. 206–219. Available at: <https://doi.org/10.1016/j.scitotenv.2018.03.161>.

¹⁴³ *10 chemicals of public health concern* (no date). Available at: <https://www.who.int/news-room/photo-story/photo-story-detail/10-chemicals-of-public-health-concern> (Accessed: 27 April 2024).

¹⁴⁴ Ibid.

the damaging impacts of poorly handled chemicals.¹⁴⁵ The national institutions discussed above should work closely to tackle toxic chemicals pollution where physical, chemical, and biological methods can be employed to reduce the pollutants' impact on the environment and human health.¹⁴⁶

While toxic chemicals pollution has increasingly affected the environment and human health across the globe, it is not too late to address the same. Kenya has the requisite legal and institutional framework that should continually be updated in line with emerging the scientific research. With enough current data, employment of science and technology as well as embracing sustainable production methods and political goodwill, Kenya can indeed address chemical pollution for sustainability.

References

'Living healthily in a chemical world – European Environment Agency' (no date). Available at: <https://www.eea.europa.eu/signals-archived/signals-2020/articles/living-healthily-in-a-chemical-world> (Accessed: 27 April 2024).

'Toxic Pollution Demands "Immediate, Ambitious Action" | Human Rights Watch' (2022), 10 March. Available at: <https://www.hrw.org/news/2022/03/10/toxic-pollution-demands-immediate-ambitious-action> (Accessed: 28 April 2024).

10 chemicals of public health concern (no date). Available at: <https://www.who.int/news-room/photo-story/photo-story-detail/10-chemicals-of-public-health-concern> (Accessed: 27 April 2024).

About human rights and the environment (no date) OHCHR. Available at: <https://www.ohchr.org/en/special-procedures/sr-environment/about-human-rights-and-environment> (Accessed: 27 April 2024).

¹⁴⁵ Ibid.

¹⁴⁶ Saravanan, A. *et al.* (2021) 'Effective water/wastewater treatment methodologies for toxic pollutants removal: Processes and applications towards sustainable development', *Chemosphere*, 280, p. 130595. Available at: <https://doi.org/10.1016/j.chemosphere.2021.130595>.

Addressing Chemical Pollution in Kenya for Sustainability

About toxics and human rights (no date) OHCHR. Available at: <https://www.ohchr.org/en/special-procedures/sr-toxics-and-human-rights/about-toxics-and-human-rights> (Accessed: 27 April 2024).

Advancing the Right to a Healthy Environment | UNEP - UN Environment Programme (no date). Available at: <https://www.unep.org/explore-topics/environmental-rights-and-governance/what-we-do/advancing-right-healthy-environment> (Accessed: 27 April 2024).

African Union, *Bamako Convention On the Ban of the Import into Africa and The Control of TransBoundary Movement and Management of Hazardous Wastes Within Africa*, 1991, 22 April 1998, in accordance with article 25.

African Union, *Treaty Establishing Common Market for Eastern and Sothern Africa* 1993, Adopted: November 5, 1993 [Kampala]. Entry into force: December 8, 1994.

African Union, *Treaty Establishing East African Community* 1999, Entry into force: July 7, 2000.

Ajibade, F.O., Adelodun, B., Lasisi, K.H., Fadare, O.O., Ajibade, T.F., Nwogwu, N.A., Sulaymon, I.D., Ugya, A.Y., Wang, H.C. and Wang, A., 2021. Environmental pollution and their socioeconomic impacts. In *Microbe mediated remediation of environmental contaminants* (pp. 321-354). Woodhead Publishing.

Aleström, P. and Winther-Larsen, H.C. (2016) '7 - Zebrafish offer aquaculture research their services', in S. MacKenzie and S. Jentoft (eds) *Genomics in Aquaculture*. San Diego: Academic Press, pp. 165–194. Available at: <https://doi.org/10.1016/B978-0-12-801418-9.00007-X>.

Anand, S., 2017. The role of science, technology and innovation in ensuring food security by 2030.

Biosafety Act, Cap 320, Laws of Kenya.

Chemical pollution – the next global crisis (no date) World Bank Blogs. Available at: <https://blogs.worldbank.org/en/climatechange/chemical-pollution-next-global-crisis> (Accessed: 27 April 2024).

Chemicals and waste... Sustainable Development Knowledge Platform (no date). Available at: <https://sustainabledevelopment.un.org/topics/chemicalsandwaste> (Accessed: 27 April 2024).

Addressing Chemical Pollution in Kenya for Sustainability

Constitution of Kenya 2010 (Republic of Kenya, 2010, Nairobi). Available at <http://www.kenyalaw.org:8181/exist/kenyalex/actview.xml?actid=Const2010>

Drakvik, E., Altenburger, R., Aoki, Y., Backhaus, T., Bahadori, T., Barouki, R., Brack, W., Cronin, M.T., Demeneix, B., Bennekou, S.H. and van Klaveren, J., 2020. Statement on advancing the assessment of chemical mixtures and their risks for human health and the environment. *Environment international*, 134, p.105267.

Dziallas, M. and Blind, K. (2019) 'Innovation indicators throughout the innovation process: An extensive literature analysis', *Technovation*, 80–81, pp. 3–29. Available at: <https://doi.org/10.1016/j.technovation.2018.05.005>.

Environment, U.N. (2021) *Human Rights and Hazardous Substances: Key Messages, UNEP - UN Environment Programme*. Available at: <http://www.unep.org/resources/report/human-rights-and-hazardous-substances-key-messages> (Accessed: 28 April 2024).

Environmental (Impact Assessment and Audit) Regulations, Legal Notice 101 of 2003, Legal Notice 133 of 2007, Legal Notice 30 of 2009, Legal Notice 32 of 2019].

Environmental (Prevention of Pollution in Coastal Zone and other Segments of the Environment) Regulations, Legal Notice 159 of 2003.

Environmental Management and Co-ordination (Air Quality) Regulations, Legal Notice 34 of 2014.

Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, Legal Notice 160 of 2006.

Environmental Management and Co-ordination (Controlled Substances) Regulations, Legal Notice 73 of 2007.

Environmental Management and Co-ordination (Waste Management) Regulations, Legal Notice 121 of 2006.

Environmental Management and Co-ordination (Water Quality) Regulations, Legal Notice 120 of 2006, Legal Notice 85 of 2012.

Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, Legal Notice 19 of 2009.

Environmental Management and Co-ordination Act, No. 8 of 1999, Laws of Kenya.

Addressing Chemical Pollution in Kenya for Sustainability

Environmental Management and Co-ordination Act, No. 8 of 1999, Laws of Kenya.

Exposure to highly hazardous pesticides: a major public health concern (no date). Available at: <https://www.who.int/publications-detail-redirect/WHO-CED-PHE-EPE-19.4.6> (Accessed: 27 April 2024).

Exposure to highly hazardous pesticides: a major public health concern (no date). Available at: <https://www.who.int/publications-detail-redirect/WHO-CED-PHE-EPE-19.4.6> (Accessed: 27 April 2024).

Fertilizers and Animal Foodstuffs Act, CAP 345, Laws of Kenya.

Food, Drugs and Chemical Substances (Food Hygiene) Regulations, 1978.

Food, Drugs and Chemical Substances Act, CAP 254, Laws of Kenya.

Industrialization and scientific and technological progress - UNESCO Digital Library (no date). Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000148272> (Accessed: 27 April 2024).

Inglezakis, V.J. *et al.* (2016) 'Chapter 3 - Aquatic Environment', in Stavros G. Pouloupoulos and Vassilis J. Inglezakis (eds) *Environment and Development*. Amsterdam: Elsevier, pp. 137–212. Available at: <https://doi.org/10.1016/B978-0-444-62733-9.00003-4>.

International Maritime Organization, *International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (May 3, 1996)*, IUCN (ID: ANA-062010).

Jain, C.K. and Singh, S. (2019) 'Best management practices for agricultural nonpoint source pollution: Policy interventions and way forward', *World Water Policy*, 5(2), pp. 207–228. Available at: <https://doi.org/10.1002/wwp2.12015>.

Jasanoff, S. (2002) 'New Modernities: Reimagining Science, Technology and Development', *Environmental Values*, 11(3), pp. 253–276.

Kjellstrom, T. *et al.* (2006) 'Air and Water Pollution: Burden and Strategies for Control', in D.T. Jamison *et al.* (eds) *Disease Control Priorities in Developing Countries*. 2nd edn. Washington (DC): The International Bank for Reconstruction and Development / The World Bank. Available at: <http://www.ncbi.nlm.nih.gov/books/NBK11769/> (Accessed: 28 April 2024).

Krupnick, A.J. and Portney, P.R. (1991) 'Controlling Urban Air Pollution: A Benefit-Cost Assessment', *Science*, 252(5005), pp. 522–528.

Landrigan, P.J. and Fuller, R., 2015. Global health and environmental pollution. *International journal of public health*, 60, pp.761-762.

Liu, L. *et al.* (2018) 'Remediation techniques for heavy metal-contaminated soils: Principles and applicability', *Science of The Total Environment*, 633, pp. 206–219. Available at: <https://doi.org/10.1016/j.scitotenv.2018.03.161>.

Mohamed, M.M.A., Liu, P. and Nie, G. (2022) 'Causality between Technological Innovation and Economic Growth: Evidence from the Economies of Developing Countries', *Sustainability*, 14(6), p. 3586. Available at: <https://doi.org/10.3390/su14063586>.

Naidu, R., Biswas, B., Willett, I.R., Cribb, J., Singh, B.K., Nathanail, C.P., Coulon, F., Semple, K.T., Jones, K.C., Barclay, A. and Aitken, R.J., 2021. Chemical pollution: A growing peril and potential catastrophic risk to humanity. *Environment International*, 156, p.106616.

Nuclear Regulatory Act, Cap 243, Laws of Kenya.

Occupational Safety and Health Act, Cap 236A, Laws of Kenya.

Pathak, V.M. *et al.* (2022) 'Current status of pesticide effects on environment, human health and it's eco-friendly management as bioremediation: A comprehensive review', *Frontiers in Microbiology*, 13, p. 962619. Available at: <https://doi.org/10.3389/fmicb.2022.962619>.

Pesticide residues in food (no date). Available at: <https://www.who.int/news-room/fact-sheets/detail/pesticide-residues-in-food> (Accessed: 27 April 2024).

Providing information on the health effects of chemicals (no date). Available at: <https://www.who.int/activities/providing-information-on-the-health-effects-of-chemicals> (Accessed: 27 April 2024).

Public Health Act, Cap 242, Laws of Kenya.

Read 'Watershed Management for Potable Water Supply: Assessing the New York City Strategy' at *NAP.edu* (no date). Available at: <https://doi.org/10.17226/9677>.

Saravanan, A. *et al.* (2021) 'Effective water/wastewater treatment methodologies for toxic pollutants removal: Processes and applications towards sustainable development', *Chemosphere*, 280, p. 130595. Available at: <https://doi.org/10.1016/j.chemosphere.2021.130595>.

Addressing Chemical Pollution in Kenya for Sustainability

Sharma, K. (2023) *Chemical Pollution: Definition, Causes, Effects, Prevention*. Available at: <https://scienceinfo.com/chemical-pollution-causes-effects-prevention/> (Accessed: 28 April 2024).

Sjoholm, P. *et al.* (2001) '13 - Gas-Cleaning Technology', in Howard Goodfellow and E. Tähti (eds) *Industrial Ventilation Design Guidebook*. San Diego: Academic Press, pp. 1197–1316. Available at: <https://doi.org/10.1016/B978-012289676-7/50016-3>.

The WHO recommended classification of pesticides by hazard and guidelines to classification, 2009 edition (no date). Available at: <https://www.who.int/publications-detail-redirect/9789241547963> (Accessed: 27 April 2024).

UN experts urge States to address human rights impact of nuclear testing (no date) OHCHR. Available at: <https://www.ohchr.org/en/press-releases/2024/03/un-experts-urge-states-address-human-rights-impact-nuclear-testing> (Accessed: 27 April 2024).

UN General Assembly recognizes human right to a clean, healthy, and sustainable environment | *International Labour Organization* (2022). Available at: <https://www.ilo.org/resource/article/un-general-assembly-recognizes-human-right-clean-healthy-and-sustainable> (Accessed: 27 April 2024).

United Nations, *Basel Convention On the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, 1989, United Nations, Treaty Series, vol. 1673, p. 57; and depositary notifications C.N.302. 1992.TREATIES-9 of 25 November 1992.

United Nations, *Convention Relating to Civil Liability in The Field of Maritime Carriage of Nuclear Material*, 1971, Adoption: 17 December 1971; Entry into force: 15 July 1975.

United Nations, *International Convention On Civil Liability for Oil Pollution Damage*, 1969, Adoption: 29 November 1969; Entry into force: 19 June 1975; Being replaced by 1992 Protocol: Adoption: 27 November 1992; Entry into force: 30 May 1996.

United nations, *International Convention On the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, 1972, 1046 UNTS 120, [ATS] 1985 16, 11 ILM 1294 (1972), UKTS 43 (1976).

United Nations, *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, Rotterdam, 10 September 1998, United Nations, Treaty Series, vol. 2244, p. 337; C.N.846. 2002.TREATIES-8 of 20 August 2002.

Addressing Chemical Pollution in Kenya for Sustainability

United Nations, *Stockholm Convention On Persistent Organic Pollutants, 2001*, The Convention was adopted on 22 May 2001 at the Conference of Plenipotentiaries on the *Stockholm Convention on Persistent Organic Pollutants, Stockholm, 22-23 May 2001*.

United Nations, UNGA Resolution 76/300 - The human right to a clean, healthy and sustainable environment, *Seventy-sixth session Agenda item 74 (b), Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms*, Resolution adopted by the General Assembly on 28 July 2022. [without reference to a Main Committee (A/76/L.75 and A/76/L.75/Add.1)].

United Nations, *Vienna Convention for The Protection of Ozone Layer, 1985*, 1513 UNTS 293, 26 ILM 1529 (1987), [1988] ATS 26.

US EPA, O. (2014) *Persistent Organic Pollutants: A Global Issue, A Global Response*. Available at: <https://www.epa.gov/international-cooperation/persistent-organic-pollutants-global-issue-global-response> (Accessed: 27 April 2024).

US EPA, O. (2015) *Basic Information about Nonpoint Source (NPS) Pollution*. Available at: <https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution> (Accessed: 28 April 2024).

What is chemical pollution? The impact on the environment - Airly WP | Air Quality Monitoring. Monitor in UK & Europe. Airly Data Platform and Monitors (no date). Available at: <https://airly.org/en/what-is-chemical-pollution/> (Accessed: 28 April 2024).