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The Role of Water in the attainment of Sustainable Development in Kenya

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Abstract

The paper seeks to critically evaluate the role of water in the attainment of sustainable development in Kenya. The paper argues that water plays a critical role in the attainment of the sustainable development goals both in Kenya and at the global stage. Sustainable Development goal number 6 recognises the role of water in the Sustainable Development agenda and seeks to ensure the availability and sustainable management of water and sanitation for all. The paper argues that water is critical in the Sustainable Development agenda by unlocking other goals such as health, education, poverty reduction, food security and affordable, clean energy and climate change mitigation.

It interrogates some of the water and Sustainable Development concerns in Kenya including water pollution, water scarcity and climate change. It then suggests practical ways through which the role of water in the Sustainable Development agenda can be enhanced. This includes integrated water management, pollution control, education, training and awareness, institutional support and the use of science and technology.

1. Introduction

The importance of Sustainable Development as a concept has become more pronounced in the 21st Century. The concept however received global attention following the publication of the *Report of the World Commission on Environment and Development: Our Common Future* which defined Sustainable Development as that which meets the needs of the present generation without compromising the ability of future generations to meet

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their own needs[1]. Sustainable development entails a combination of elements including environmental protection, economic development and social concerns[2]. It seeks to address intra-generational equity, that is equity among the present generation and inter-generation equity which is equity between the present and future generations [3]. Sustainable Development was considered in the case concerning the *Gabcikovo-Nagymaros Project, (Hungary v Slovakia)*[4] where the International Court of Justice emphasized the need to reconcile economic development with protection of the environment for the benefit of present and future generations.

The importance of this concept has led to the adoption of the Sustainable Development goals as the global blueprint for development. The 2030 Agenda for Sustainable Development which was adopted by all United Nations member states in 2015, entails a shared blueprint for peace and prosperity for people and the planet for both the present and future generations [5]. The Sustainable Development Goals define Sustainable Development broadly to entail issues such as poverty reduction, reducing inequalities, promoting gender equality, education and health, addressing the effects of climate change and environmental protection [6]. This approach contains both an anthropocentric approach that focuses on human development and an ecocentric approach that focuses on environmental conservation and further incorporates elements of inter and intra generational equity [7]. The Rio Declaration captures the concept of inter and intra generation equity and sets out that the right to development must be fulfilled

[1] World Commission on Environment and Development, *Our Common future*. Oxford, (Oxford University Press, 1987).
[2] Fitzmaurice, M., 'The Principle of Sustainable Development in International Development Law' *International*
Sustainable Development Law, Vol. 1
[3] Ibid
[4] Case Concerning the *Gabcikovo-Nagymaros Project, (Hungary v Slovakia* 1997 WL 1168556 (ICJ)
[5] United Nations, Department of Economic and Social Affairs, 'Sustainable Development' available at https://sdgs.un.org/goals (accessed on 26/04/2022)
[6] Ibid
[7] Muigua. K., 'Nurturing Our Environment for Sustainable Development' Glenwood Publishers Kenya Limited, 2016

in order to equitably developmental and environmental needs of present and future generations[8].

In Kenya, the importance of the concept of Sustainable Development has also been recognised. The Constitution captures it as one of the national values and principles of governance[9]. The state and all persons are mandated to be guided by the principle of Sustainable Development in all matters including interpretation of any law and implementing public policy decisions[10]. It is also captured under the Environmental Management and Co-ordination Act which defines Sustainable Development as that which meets the needs of the present generation without compromising the ability of future generations to meet their needs by maintaining the carrying capacity of the supporting ecosystems [11] . The country's development blueprint, Vision 2030, further acknowledges the importance of Sustainable Development and seeks to achieve a nation that has a clean, secure and sustainable environment by 2030 through inter alia promoting environmental conservation[12].

The concept of Sustainable Development has also received judicial pronouncement in Kenya. In *John Muthui & 19 others v County Government of Kitui & 7 others* [13] the Court observed as follows with regards to Sustainable Development:

> *'The four (4) recurring elements that comprise the concept of 'Sustainable Development' is the need to preserve natural resources for the benefit of future generations (the principle of intergenerational equity); exploiting natural resources in a manner which is*

[8] Rio Declaration on Environment and Development' Principle 3
[9] Constitution of Kenya, 2010, Article 10 (2) (d)
[10] Ibid, Article 10 (1)
[11] Environmental Management and Co-ordination Act, No. 8 of 1999 (Rev 2019), S 2.
[12] Kenya Vision 2030, available at *http://vision2030.go.ke/wp-content/uploads/2018/05/Vision-2030-Popular-Version.pdf* (accessed on 30/06/2022)
[13] John Muthui & 19 others v County Government of Kitui & 7 others, ELC Petition No. E06 of 2020, (2020) eKLR

> *'sustainable', 'prudent', 'rational', 'wise' or 'appropriate' (the principle of sustainable use); the 'equitable' use of natural resources, and the need to ensure that environmental considerations are integrated into economic and other development plans, programmes and projects, (the principle of integration).'*

The Court further noted that Sustainable Development is a principle with a normative value, demanding a balance between development and environmental protection, and as a principle of reconciliation in the context of conflicting human rights, that is the right to development and the right to protecting the environment[14].

It is thus evident that Sustainable Development is a principle that has been given utmost importance at both the global and national stage. This paper seeks to critically discuss the role of water in the attainment of Sustainable Development in Kenya. Towards this end the paper will discuss the nexus between water and Sustainable Development; examine the challenges facing attainment of Sustainable Development in Kenya and explore the role of water as a tool of attaining Sustainable Development in Kenya.

2. The Nexus between Water and Sustainable Development

Sustainable Development goal number 6 recognises the role of water in the Sustainable Development agenda and seeks to ensure the availability and sustainable management of water and sanitation for all[15]. The inclusion of this goal recognizes that water is at the heart of all aspects of Sustainable Development[16]. It has been correctly argued that there is a clear link between properly managed water resources, economic development and social

[14] Ibid

[15] United Nations, Department of Economic and Social Affairs, Sustainable Development goal 6- clean water and sanitation, available at *https://sdgs.un.org/goals/goal6* (accessed on 30/06/2022)

[16] Ait-Kadi.M., 'Water for Development and Development for Water: Realizing the Sustainable Development Goals (SDGs) Vision' *Aquatic Procedia* 6 (2016) 106 – 110

wellbeing which are key pillars of the Sustainable Development agenda[17]. According to the United Nations Environment Programme (UNEP), sustainable management of water resources and access to safe water and sanitation are essential for unlocking economic growth and productivity, and providing significant leverage for existing investments in health and education[18]. UNEP further opines that improving water management makes national economies, the agriculture and food sectors more resilient to rainfall variability and able to fulfil the needs of growing populations[19].

Water is thus essential to the Sustainable Development agenda by unlocking other goals such as health, education, poverty reduction, food security and affordable and clean energy. It is necessary for domestic use, agricultural activities geared towards food production, industrial uses and hydroelectric generation which is a key component of the quest towards access to clean and affordable energy. Water thus affects the entire development agenda[20]. It is embedded in almost all the Sustainable Development goals especially those dealing with food, the environment and energy. This therefore means that attainment of the Sustainable Development goals is only plausible where the goal relating to water is achieved[21].

Studies have also placed water at the center of economic development by establishing the relationship between water and development. It is asserted that water is essential for sustainable socio-economic development and, in turn, that development provides the necessary resources to invest in

[17] Koudstaal.R et al., 'Water and Sustainable Development' available at *https://www.ircwash.org/sites/default/files/210-92WA-11000.pdf* (accessed on 30/06/2022)
[18] United Nations Environment Programme, 'Goal 6: Clean Water and Sanitation' available at *https://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-6* (accessed on 30/06/2022)
[19] Ibid
[20] Ait-Kadi.M., 'Water for Development and Development for Water: Realizing the Sustainable Development Goals (SDGs) Vision, Op Cit
[21] Ibid

improving water security, water infrastructure and water institutions[22]. The role of water in development is critical especially in developing countries located in arid and semiarid area[23]. Water scarcity in such countries has affected the socio-economic development agenda including food security, access to health and education in most cases resulting in underdevelopment. This has created the awareness of the critical importance of efficient water management for Sustainable Development in these countries[24].

In Kenya, the Constitution recognizes the right to clean and safe water in adequate quantities as an essential economic and social right[25]. The Constitution further calls upon the national government to protect the environment and natural resources with a view of establishing a durable and sustainable system of development through inter alia protection of water and water resources[26]. The Water Act further recognizes the role of water in sustainable development and provides for the legal framework for the regulation, management of water and water resources in accordance with the Constitution[27]. Water is thus an essential part of the Sustainable Development agenda both in Kenya and at the global stage.

3.0 Water and Sustainable Development Concerns in Kenya

3.1 Water Scarcity

Despite its importance in sustaining life and economic development, the problem of water scarcity continues to be experienced in Kenya and the world at large[28]. The United Nations estimates that water scarcity affects

[22] Sadoff, C, et al Securing Water, Sustaining Growth. Report of the GWP/OECD Task Force on Water Security and Sustainable Growth. Oxford, UK: University of Oxford (2015).

[23] Biswas. A., 'Water for sustainable development in the 21st century: A global perspective' available at h*ttps://thirdworldcentre.org/wp-content/uploads/2015/05/Water-for-sustainable-development-in-the-21st-century.pdf* (accessed on 30/06/2022)

[24] Ibid

[25] Constitution of Kenya, 2010, Article 43 (1) (d)

[26] Ibid, Fourth Schedule, Part 1 (22) (c)

[27] Water Act, Cap 372, Laws of Kenya, S 3

[28] Muigua.K., Wamukoya.D & Kariuki.F., 'Natural Resources and Environmental Justice in Kenya' Glenwood Publishers Kenya Limited, 2015, P 178

more than 40 percent of the global population with the figure expected to rise due to the adverse effects of climate change[29]. A country is classified as water scarce if the per capita water availability is below 1700 cubic meters per year[30]. Kenya is categorized as a water scarce country with per capita availability of below 1000 cubic meters annually[31]. The problem of water scarcity that is prevalent especially in developing countries has been attributed to several factors including rapid increase in population, economic development and urbanization.

Water scarcity in Kenya and across the globe hinders the attainment of Sustainable Development by affecting socio-economic activities, attainment of food security, health, education and climate change mitigation[32]. It results in poor sanitation and hygiene habits posing substantial health risk thus curtailing the attainment of sustainable goal number 3 geared towards ensuring good health and wellbeing for all[33]. It also affects agricultural and food production activities thus curtailing the attainment of Sustainable Development goal number 2 geared towards attainment food security[34]. Water scarcity also affects attainment of Sustainable Development goal number 4 geared towards quality education especially in arid and semi-arid regions since children miss out from attending school in search of water. Water scarcity is thus a critical concern in the Sustainable Development debate. Addressing this issue is important in the quest towards attainment of Sustainable Development both in Kenya and at the global stage.

3.2 Water Pollution

The Water Act defines water pollution as any direct or indirect alteration of the physical, thermal, chemical or biological properties of the water resource

[29] United Nations Development Programme, 'Sustainable Development Goals, Goal No.6' available at *https://www.undp.org/content/dam/undp/library/corporate/brochure/SDGs_Booklet_Web_En.pdf* (accessed on 01/07/2022)

[30] Mulwa. F et al., 'Water Scarcity in Kenya: Current Status, Challenges and Future Solutions' available at *https://www.scirp.org/pdf/oalibj_2021011916254447.pdf* (accessed on 01/07/2022)

[31] Ibid

[32] Ibid

[33] United Nations, Department of Economic and Social Affairs, Op Cit goal no.3

[34] Ibid, goal no. 2

so as to make it less fit for any beneficial purpose for which it is or is reasonably be expected to be used; or harmful or potentially harmful to the welfare, health or safety of human beings; any aquatic or non-aquatic life or property or the environment[35]. Water pollution is a major concern in Kenya. This is caused by various factors including rapid urban development, agricultural activities which result in discharge of organic matter, agrochemicals and drug residues into water bodies, improper sewage disposal and oil spills[36]. Water resources such as rivers and lakes are polluted on a daily basis from industrial and domestic waste. A good example is the Nairobi River that is polluted by among others industries which dump waste directly into the river without treatment[37]. The river is filled with all sorts of contaminants to an extent that it is difficult to spot aquatic life in it[38].

Pollution of water and water resources undermines the attainment of Sustainable Development. It has severe consequences on both humans and the environment. It possess health hazards such as waterborne diseases and cancer as result of radioactive wastes[39]. It also has effects on the environment through death of aquatic life and an imbalanced ecosystem[40]. The 2030 Agenda for Sustainable Development seeks to improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally[41]. The Water Act recognizes the effects of water pollution and seeks to promote proper regulation, management and development of water resources by

[35] Water Act, Cap 372, S 2

[36] African Researchers Consortium., *'The Water Pollution Crisis in Kenya: What we need to do to avert this situation'* available at https://researcharc.org/the-water-pollution-crisis-in-kenya-what-we-need-to-do-to-avert-this-situation/ (accessed on 01/07/2022)

[37] Earth 5 R., 'Nairobi River Pollution: Scope for the Future' available at https://earth5r.org/fighting-communities-nairobi/ (accessed on 01/07/2022)

[38] Ibid

[39] African Researchers Consortium., *'The Water Pollution Crisis in Kenya: What we need to do to avert this situation,* Op Cit

[40] Ibid

[41] United Nations 2030 Agenda for Sustainable Development, available at *https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf* (accessed on 01/07/2022)

providing a legal framework to conserve and preserve water and water resources from pollution[42]. Attainment of Sustainable Development thus calls upon conserving and protecting water resources from pollution.

3.3 Climate Change

Climate change as defined by the United Nations Framework Convention on Climate Change (UNFCC) means a *'change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'*[43]. The Climate Change Act on the other hand defines climate change as a *'change in the climate system which is caused by significant changes in the concentration of greenhouse gases as a consequence of human activities and which is in addition to natural climate change that has been observed during a considerable period.'*[44] Climate change is arguably the most fundamental global concern in the 21st century. The Sustainable Development agenda calls for urgent action to combat climate change and its impacts[45]. It sets an ambitious target to limit the increase in global mean temperature to two degrees Celsius above pre-industrial levels in order to avoid the worst effects of climate change[46]. This has seen the adoption of the Paris Agreement by most countries which calls for concerted efforts to strengthen the global response to the threats of climate change through inter alia holding increase in global temperatures; fostering climate resilience and making finance flows towards low greenhouse gas emissions and climate resilient development[47].

It is argued that the effects of climate change are more prevalent in developing economies where populations are most vulnerable and less likely

[42] Water Act, Cap 372, S 2

[43] United Nations Framework Convention on Climate Change (United Nations, 1992), Article 1 (2), available at *https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf* (accessed on 01/07/2022)

[44] Climate Change Act, No. 11 of 2016, Laws of Kenya, S 2.

[45] United Nations, Department of Economic and Social Affairs, Op cit goal 13

[46] Ibid

[47] Paris Agreement, Article 2, available at *https://unfccc.int/sites/default/files/english_paris_agreement.pdf* (accessed on 01/07/2022)

to adapt to the effects of climate change[48]. Climate change can thus affect the potential of development in such countries. Climate change is pertinent in the Sustainable Development debate since its effects can curtail the attainment of Sustainable Development goals including combating poverty, food security, health, employment and gender equality[49]. Attainment of Sustainable Development thus calls upon efforts towards climate change resilience, mitigation and adaptation.

Water is inextricably linked to the climate change debate. It has been asserted that climate change has been linked with changes in the global hydrological cycle such as increased atmospheric water content and changes in precipitation patters[50]. Due to the adverse effects of climate change, there have been massive degradation of water catchment areas and drying up of rivers. Water sources are among part of the ecosystem that is most sensitive to climate change as evidenced by drying of rivers and lakes and rise in ocean levels due to the adverse effects of climate change[51]. Further soil erosion due to flooding has resulted in siltation of dams which are critical in the supply of water resulting in deterioration of water quality thus affecting water supply. This hinders attainment of Sustainable Development goals such as food security, health and access to clean and safe water.

Water plays an important role in enabling human adaptation to climate change[52]. The Water Act advocates for incentive programmes for water

[48] Muigua. K., 'Nurturing Our Environment for Sustainable Development' Op Cit
[49] Muigua.K., Wamukoya.D & Kariuki.F., 'Natural Resources and Environmental Justice in Kenya' Op Cit
[50] Glenn.W et al., 'Climate change and water in the UK – past changes and future prospects' available at *http://pureoai.bham.ac.uk/ws/files/28288312/Watts_et_al_Climate_change_water_2015_Progress_Physical_Geography.pdf* (aceessed on 03/07/20222)
[51] Ibid
[52] Taylor.G., et al, *'Ground water and climate change'* available at *https://d1wqtxts1xzle7.cloudfront.net/37998805/Taylor_etal_2012_nclimate1744-with-cover-page v2.pdf?Expires=1656857354&Signature=fmvtKECAZW9CVXMSkwYvTf0B~Jt1CAQt50RZu~o8BMybVuqO4bZ86rS3pnlOl4GDQcWILmIXcLlth~KeaeckOacJZzKkqW7C71w6esVqot0id2c-2zrgcbj~vlFZd52w8SNa1ZCHYgTXGEjx4oRzM5RohChT1FIvGIhQumIWmJPNxRK0PO~t62UWoiQMBoQAYlKGj6OfyZOZ226d8M~tufF08siCpI1L8~L8Zg~59wm*

resources management towards climate change adaptation and mitigation[53]. Clean water policies are essential in climate change mitigation especially from the water-energy perspective[54]. Implementation of the Sustainable Development goal 6 targets towards water access and waste water treatment results in minor impacts on the energy sector which is crucial in the climate change debate[55]. Further, the increased adaptation of solar and wind technologies results in reduction of carbon and water intensity of electricity aiding in climate change mitigation[56]. Water is thus crucial in the climate change debate.

4.0 Way Forward

The foregoing discussion demonstrates that water is critical in the Sustainable Development agenda. However, challenges related to water such as water scarcity, water pollution and climate change hinder the effective attainment of the Sustainable Development goals. The following can be done to enhance the role of water in the attainment of Sustainable Development in Kenya.

4.1 Efficient Management of Water and Water Resources

At the heart of the Sustainable Development goal 6 geared towards ensuring availability and sustainable management of water and sanitation for all is the concept of integrated water resources management at all levels including through transboundary cooperation[57]. Integrated water resources management is a concept that embraces all users of water and is aimed at understanding how water resources link with different sectors of the society[58]. It recognizes the fact that decisions in one sector affect other sectors and emphasizes making changes in decision/policy making processes

Wrq~pNFRDaHN6HEIZOctrGay0hRuSF5wXDmgZvw0S2qmTb6ckNWrwopB33p odMPMOHu2bl3at-KXkuO9CZdNlpMQqMSXTtmHiNLwOo9WRKA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA (accessed on 03/07/2022)

[53] Water Act, Cap 372, S 116 (1) (i)

[54] Parkinson. S et al., 'Balancing clean water-climate change mitigation trade-offs' Environ. Res. Lett. 14 (2019)

[55] Ibid

[56] Ibid

[57] United Nations 2030 Agenda for Sustainable Development, Op Cit

[58] Ait-Kadi.M., 'Water for Development and Development for Water: Realizing the Sustainable Development Goals (SDGs) Vision, Op Cit

and governance perspectives in order to improve equity and human welfare and promote sustainable development [59] . Integrated water resources management covers the manner in which roles and responsibilities are exercised in the management of water and encompasses both formal and informal institutions[60]. It thus calls for effective governance of water in manner that promotes inclusiveness and accountability[61]. There is thus need to adopt integrated water resources management as a viable alternative to the hitherto traditional approaches to water and water resources governance.[62] The government and policy makers should embrace and accept this interconnectedness and adopt an integrated approach towards water resources management.

4.2 Pollution Control

One of the major challenges facing the water sector is the pollution menace. This hinders the attainment of the Sustainable Development goals. Pollution control can be achieved through an integrated approach geared towards prevention of emissions and effective waste management in order to protect water sources and the environment[63]. Industries should be encouraged to treat industrial waste before discharging it in order to prevent water pollution. Further, section 72 of the Environmental Management and Co-Ordination Act should be actualized. The section makes it an offence to discharge pollutants including poison, toxic, noxious or obstructing matter, radioactive waste into the aquatic environment in contravention of the water pollution control standards[64]. A person found guilty under the section is liable to imprisonment for a term not exceeding two years or to a fine not exceeding one million shillings or to both[65]. Such efforts are critical in ensuring that water and water resources are utilized in a sustainable manner towards attainment of the Sustainable Development goals.

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[59] Ibid
[60] Muigua.K., Wamukoya.D & Kariuki.F., 'Natural Resources and Environmental Justice in Kenya' Op Cit
[61] Ibid
[62] Ibi
[63] Ibid
[64] Environmental Management and Co-Ordination Act, No. 8 of 1999, S 72 (1)
[65] Ibid

4.3 Education, Training and Awareness

Some of the challenges in the water sector such as pollution and poor management of water is a result of ignorance. It is thus important to create awareness on the need for efficient use of water resources through education and training[66]. This should target all players including the public, the private sector and policy makers. Training of water resources managers is instrumental in passing on the concept of integrated water management and providing them with the tools for implementation of this concept[67]. Training of the public is important is crucial in promoting good water management practices such as reusing and recycling water and pollution control.

4.4 Institutional Support

Management of water and water resources can only be effective if the institutions responsible for such management are efficient[68]. It is thus essential to strengthen the capacity of water management institutions in order to make them better equipped to discharge their mandate. In Kenya, the Water Resources Authority is established under the Water Act to safeguard the right to clean water by ensuring that there is proper regulation of the management and use of water resources[69]. There is need to support the activities of this institution among other regional water management institutions in order to attain sustainable development in Kenya.

4.5 Use of Science and Technology

Science and technology can offer effective solution to most environmental concerns affecting the world[70]. Science and technology can aid in environmental management through an analysis of the mechanisms and processes underlying human interaction with the environment and application of scientific knowledge through actions geared towards

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[66] Koudstaal.R et al., 'Water and Sustainable Development, Op Cit

[67] Ibid

[68] Biswas. A., 'Water for sustainable development in the 21st century: A global perspective' Op Cit

[69] Water Act, Cap 372, S 12

[70] Huesemann. M.H., 'Can Pollution Problems Be Effectively Solved by Environmental Science and Technology? An Analysis of Critical Limitations, Ecological Economics, Volume 37, Issue 2, May 2001, pg 271-287

environmental protection and conservation. [71] However, science and technology has not been effectively adopted as a tool of environmental management in Kenya due to factors such as lack of awareness and knowledge of such technologies; inadequate funding; limited technical competence and slow adoption of modern technological options[72]. There is thus need for adoption of science and technology in water management in Kenya. Some of these technologies include industrial waste treatment, green and clean technologies and climate change mitigation strategies[73].

5.0 Conclusion

Water plays an important role in the attainment of Sustainable Development in Kenya. It is embedded in almost all the Sustainable Development goals and contributes towards unlocking goals such as health, education, poverty reduction, food security and affordable and clean energy. Water is thus central to the Sustainable Development agenda. However, concerns such as water scarcity, water pollution and climate change hinder the role of water in the Sustainable Development agenda in Kenya. There is thus need to address these concerns through integrated water management, pollution control, education, training and awareness, institutional support and the use of science and technology. Effective use and management of water and water resources in Kenya for Sustainable Development is an ideal that can be achieved.

[71] Voulvoulis.N., & Burgman.M.A., The Contrasting Roles of Science and Technology in Environmental
Challenges, Critical Reviews in Environmental Science and Technology, Volume 49, 2019, issue 12

[72] National Environment Management Authority, 'The National Solid Waste Management Strategy', available at *http://meas.nema.go.ke/pops/download/National-Solid-Waste-Management-Strategy-_2.pdf* (accessed on 12/07/2022)

[73] Muigua. K., 'Utilising Science and Technology for Environmental Management in Kenya' available at *http://kmco.co.ke/wp-content/uploads/2020/04/Utilising-Science-and-Technology-for-Environmental-Management-in-Kenya.pdf* (accessed on 12/07/2022)

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http://pureoai.bham.ac.uk/ws/files/28288312/Watts_et_al_Climate_change_water_2015_Progress_Physical_Geography.pdf

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National Environment Management Authority, 'The National Solid Waste Management Strategy', available at *http://meas.nema.go.ke/pops/download/National-Solid-Waste-Management-Strategy-_2.pdf*

Paris Agreement, available at
https://unfccc.int/sites/default/files/english_paris_agreement.pdf

Parkinson. S et al., 'Balancing clean water-climate change mitigation trade-offs' Environ. Res. Lett. 14 (2019)

Rio Declaration on Environment and Development Sadoff, C, et al Securing Water, Sustaining Growth. Report of the GWP/OECD Task Force on Water Security and Sustainable Growth. Oxford, UK: University of Oxford (2015).

Taylor.G., et al, *'Ground water and climate change'* available at *https://d1wqtxts1xzle7.cloudfront.net/37998805/Taylor_etal_2012_nclimate1744-with-cover-pagev2.pdf?Expires=1656857354&Signature=fmvtKECAZW9CVXMSkwYvTf0B~Jt1CAQt50RZu~o8BMybVuqO4bZ86rS3pnlOl4GDQcWILmIXcLlth~KeaeckOacJZzKkqW7C71w6esVqot0id2c-2zrgcbj~vlFZd52w8SNa1ZCHYgTXGEjx4oRzM5RohChT1FIvGIhQumIWmJPNxRK0PO~t62UWoiQMBoQAYlKGj6OfyZOZ226d8M~tufF08siCpI1L8~L8Zg~59wmWrq~pNFRDaHN6HEIZOctrGay0hRuSF5wXDmgZvw0S2qmTb6ckNWrwopB33podMPMOHu2bl3at-KXkuO9CZdNlpMQqMSXTtmHiNLwOo9WRKA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA*

United Nations 2030 Agenda for Sustainable Development, available at *https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf*

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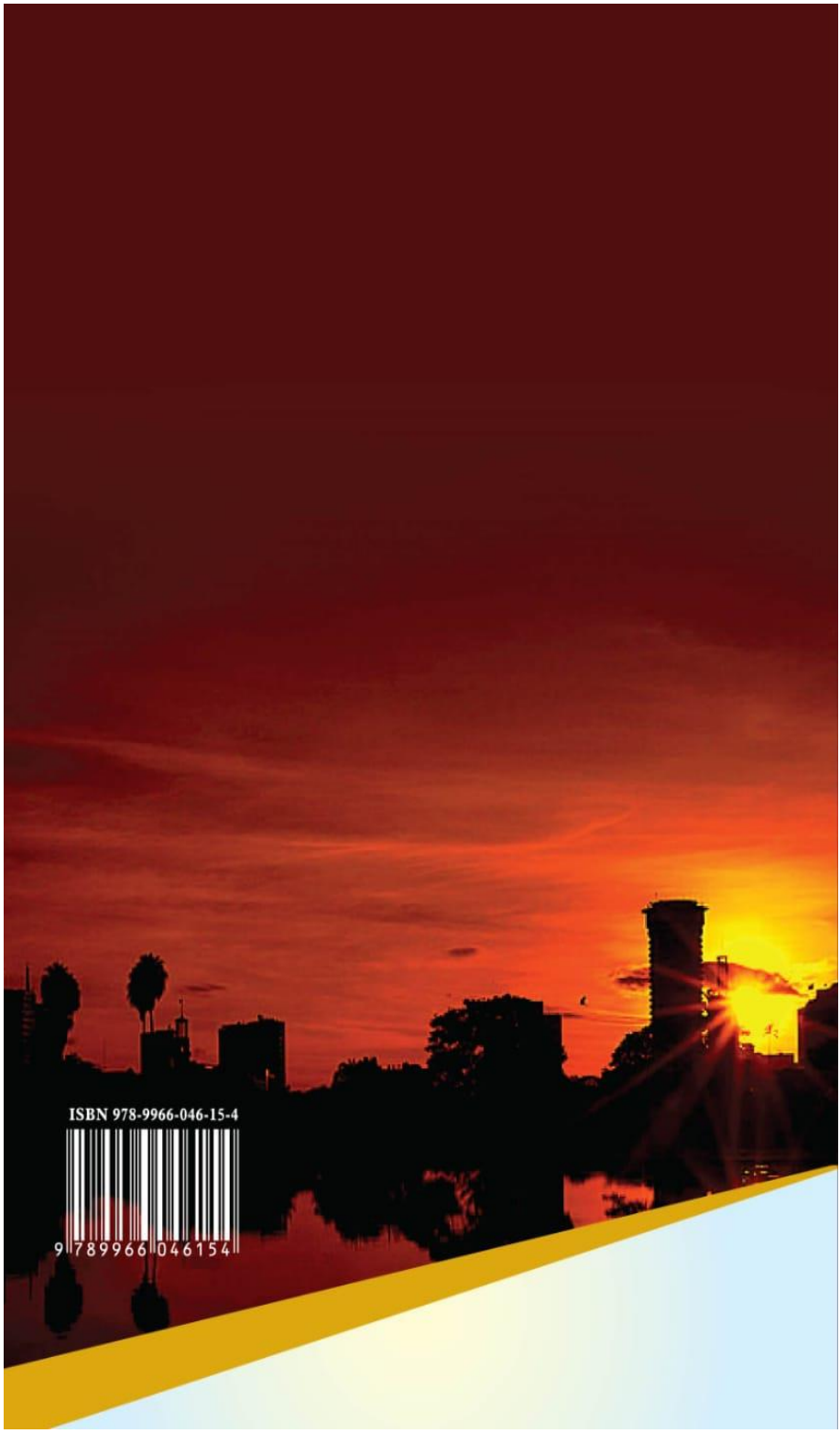
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