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Transforming Universities
for a Changing Climate

Kenya's climate change policy actions and the response of higher education

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for a Changing Climate
Working Paper Series
No. 4

Jackline Nyerere,
Winniejoy Gatwiri,
and Rachel Okinyi

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Abstract

Kenya's climate pattern is increasingly less reliable, with multiple and overlapping social, health and economic effects. Drawing on national and international policy documents, peer-reviewed journal articles and national climate change reports published between 1999 and 2020, this working paper contributes to our understanding of the policy environment guiding university education in Kenya response to climate change issues. While the working paper discusses some policies in Kenya relating to sustainable development and climate change, many of them drawing on the international goals and agreements, it exposes a gap in guiding universities to respond to the impacts of climate change. There is little research and content on climate change in the Kenyan universities' curricula, campus activities, institutional governance, and community engagement work. This is partly due to a weak link between national policies, institutional policies, and universities' activities. Information on climate change responses by universities in Kenya is scanty. Through literature review, the working paper points out some material on sustainable development initiatives in universities and their impact on the society, environment, and economy. The working paper recommends an adjustment of Kenya government policies to better guide higher learning institutions in their role in addressing climate change issues at both campus and community levels.





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1. Introduction

On 30 August 1994, Kenya endorsed its membership in the United Nations Framework Convention on Climate Change (UNFCCC) and ratified Kyoto Protocol on 25 February 2005 which became operational on 26 May 2005 (Republic of Kenya, 2015). The UNFCCC Articles 6 and 12 of the Paris Agreement recognise that education, training, and public awareness are essential in adaptation and mitigation of risky climate human interference (Paris Agreement, 2015). As a party to the conventions, Kenya is obligated to meet the convention commitments. According to Snellman (2015), universities embrace a social role to be able to provide education that meets the needs of a knowledge society. University education addresses social concerns such as the ramifications of climate change, a global challenge that had started receiving attention even before the Paris Agreement (Klein et al. 2005). The authors explained that climate change is the consequence of socio-economic development patterns characterised by economic growth, technology, population growth, and governance that result in the emission of greenhouse gases. It is no doubt that climate change has enhanced the vulnerability of African countries, especially since their economies are climate-sensitive (Recha et al., 2017). Contributions of universities beyond knowledge production are critical in addressing climate change, given the profound social, political, and economic issues, and the need to engage with professional development, civic action, and public awareness in Kenya.

Many studies have highlighted the role universities could play in modelling sustainable development and climate change through knowledge production, training and public awareness (Dziminska et al., 2020). Higher education institutions face the challenge of developing future leaders and decision-makers capable of understanding and providing solutions to complex, politicised and global issues such as climate change (Fahey, 2012). Fahey's study on curriculum change and climate change uses a case study of a multidisciplinary postgraduate climate change programme at an Australian University to illustrate the challenges addressed when reforming the curriculum. The study, whose findings are generalizable for countries in Africa, argues that to future-proof graduates, curricular intentions need to be aligned with the institution's capacity for action towards climate change. The study recommends that universities require a relevant curriculum that addresses the nature of the changing climate to generate knowledge that can provide solutions to the problems related to climate change.

Musarurwa (2012), in a paper on climate change education in the era of sustainable development, also recognises the need for the universities to benefit from their relationship with communities through the adaptation of indigenous knowledges and recommends adoption of issue-based curriculum as a way of ensuring that climate change is integrated, infused and mainstreamed. A systematic review by Findler et al. (2019) which covers peer-reviewed journal articles published between 2005 and 2017, establishes a limitation on the analysis of the impacts of climate change out of lack of a more holistic perspective given that

many studies reviewed were cases dealing with specific projects. Findler et al.'s study expresses the need for a collaborative, multi-sectoral approach involving universities as well. They feel that the numerous climate change issues require the involvement of university students, faculty and local communities to co-construct adaptation and mitigation measures.

There is little in the literature on how climate change is represented in the Kenyan universities' curricula, campus activities, institutional governance and community engagement work. Available literature leans towards sustainable development initiatives in higher education institutions and their general impact on the society, environment and economy, and not specifically on climate change (O'Flaherty and Liddy, 2018). This review intends to contribute to the understanding of the trajectories of the impact of higher education on climate change in Kenya. The study looks at the policy environment in Kenya regarding climate change and the link between national policies and university policies, actions and practices in response to climate change effects. The review is guided by two questions:

- i. What are the national policies guiding mitigation and adaptation of climate change impacts in Kenya, and how do they link with higher education policies?
- ii. What roles are the Kenyan universities playing in raising awareness and enhancing their institutional and human resource capacity on climate change mitigation, adaptation, impact reduction and early warning?

The review questions are pegged on the Sustainable Development Goal 13 which targets to strengthen resilience and adaptive capacity to climate-related risks through integrating climate change measures into the national policies and education (UN, 2015). The scope of the review is on Kenyan universities, both public and private. It excludes higher education institutions not offering undergraduate degrees given their distinct contexts.

1.1 Kenya's climate

Kenya's climate varies in respect to the topography as the landscape rises from the Indian Ocean in the east to the edge of the East African Plateau and the Great Rift Valley in the West (McSweeney, New & Lizcano, 2010). The Kenyan climate is tropical along the Indian Ocean, temperate in the highlands and very dry in the north and northeast. It is moderately warm except the coastal region, which is hot and humid, and the northern part which is hot and dry. Conventionally, Kenya experiences long and short rainy seasons from April to June, and from October and December, respectively (Republic of Kenya, 2018b). The rainy seasons in Kenya are a result of changes in the Inter-Tropical Convergence Zone (ITCZ) in the course of the year. Furthermore, McSweeney et al. (2010) note that changes in the Indian Ocean sea surface temperatures are responsible for the changes in the ITCZ. The Indian Ocean is also liable for the El Niño, heavy rains in the short rain seasons and La Niña, extreme cold and dry season compared to average (McSweeney et al., 2010). Typically, the country experiences cool, dry season and warm, dry seasons from



July to September, and between January and March, respectively (Parry et al., 2012). Central highlands regions are cooler, at 15°C compared to the coast regions 29°C. During the year, temperatures vary with a 2°C drop in the cold season (McSweeney et al., 2010). Even then, Kenya climate trends have been observed to be changing (Kogo et al., 2020; Ochieng et al., 2016; Okello et al., 2015).

In the recent past, temperature and rainfall variability have been witnessed in most parts of the country (UNFCCC, 2019). Temperature trends show increased mean annual temperature by approximately 1°C since 1960. In accordance with Kenya's climate profile by the Republic of Kenya (2015), the annual average temperatures have increased significantly at a rate of 0.34°C per decade over the last 30 years. Hot days per year have increased by approximately 15.6% in the period 1960-2003 on average, with the highest rate of increase being experienced in the months of March, April and May (McSweeney et al., 2010). Furthermore, the months of September to November have been observed to have the highest increase in the average number of hot nights which has risen by approximately 31% of days per year. The greatest decrease in the number of cold days has been observed in the months of September to November and the highest drop in the cold nights has been observed in the months of December to April (Republic of Kenya, 2015). In the period 1901 to 2012 the Western Indian Ocean, which borders Kenya at the coast region, experienced increased sea surface temperatures of 1.2°C (Roxy, Ritika, Terray and Masson, 2014). Republic of Kenya (2015) records that the northern parts of the country have had increased rainfall while the Kenyan southern parts have had a reduced amount of rainfall. The government further observed extended rainy periods, increased rain intensity and reduced long wet season. McSweeney et al.'s (2010) observations on the Kenyan Indian Ocean contribution to the country rainfall intensity confirmed Black's (2004) study findings of association of East African heavy short rain seasons with the warming Western Indian Ocean. The country experienced in early October 2019 to January 2020 the wettest short rain seasons since 1985, exceeded singly by 1997 (Wainwright et al., 2020).

2.0 Policies and strategies for climate action in Kenya

Kenya is one of the developing countries in sub-Saharan Africa with progressive climate change policies. The Kenyan constitution, under article 43, provides for the right to clean and healthy environment, which includes environmental protection for the benefit of present and future generations through legislation and measures contemplated in Article 69 (Republic of Kenya, 2010). The role of the state in ensuring sustainable development, increasing the present forest cover, conservation of biological diversity, and engagement of public, agencies and ministries in genetic resources conservation is recognised in the constitution which provides two levels of governance, the National and County governments. The importance of the environment is emphasized in several chapters and schedules of the constitution, Chapter Four under 'Rights and Fundamental Freedoms', Chapter Five under 'Environment and Natural Resources', Chapter Ten, under 'Judicial Authority and Legal System', the Fourth and Fifth Schedules under 'Distribution of functions between National and County government' and under 'Legislation to be enacted by parliament' respectively.

In 2010, Kenya developed the National Climate Change Response Strategy (NCCRS), which marked the beginning of acknowledging climate change and its impacts (Republic of Kenya, 2010a). The purpose of this NCCRS was to put in place robust measures needed to address most of the challenges posed by climate change. The document considered climate change as one of the most severe threats to sustainable development globally. It provides strategies to enhance understanding of climate change in a global and local context. Assessing the evidence and impacts of climate change in Kenya, the response strategy found that climate change ramifications affect the country in many ways including food security (Republic of Kenya, 2010a). NCCRS thus proposes adaptation and mitigation strategies such as production and promotion of drought-tolerant crop varieties and the provision of special livestock insurance schemes to spread and transfer risks from climate change (Republic of Kenya, 2010a). The NCCRS policy document outlines interventions to be undertaken in all the vulnerable sectors and advocates for communication, education and awareness programmes on climate change. It proposes the establishment of a National Climate Change awareness campaign using print and electronic media, and incorporation of climate change information into schools and colleges' curricula.

Assessing progress in implementation of the NCCRS two years on, Kariuki (2012) found that school curriculum and its contribution to awareness of climate change among learners in secondary schools established that climate change was not well presented. Kariuki's assessment revealed that climate change content was only integrated in one subject, Geography, which is optional for students. The author notes that integrating climate change matters in only one optional subject limited climate change awareness among students who did not take the subject. In the same period, Sayo (2012) observed that television content on environmental issues was very little, of poor quality characterized by complex terms, and was aired at non-prime time making it irrelevant to the local audiences. In the recent past, Ageyo and Muchunku (2020) have noted that in Kenya, dissemination practices of climate change information are not effective for the grassroots communities because of their language barriers. NCCRS has thus been criticised as a techno-managerial response to the impending disaster, characterising adaptation as a necessary, unproblematic and technical project that fails to address the uneven outcomes of adaptation processes and the issue of equity in adaptation policy (Symons, 2014).

Njoroge et al. (2017), employing semi-structured interviews with 49 key informants drawn from the government departments, local and international non-governmental organisations (NGOs), tourism sector representatives, Kenya private sector associations, research institutions and religious organizations to establish the inclusionary processes at play in the climate change policy-making process in Kenya, found that the process faced inclusion and exclusion challenges brought about by conflict of interest and power play. Both Symons (2014) and Njoroge et al. (2017) studies show that policy outcomes are shaped by discourses and narratives, actors, institutions and networks, and politics and interests. The policy process thus enhances learning as different stakeholders come in with different experiences, understanding and narratives.

Kenya developed the first action plan, 'National Climate Change Action Plan (NCCAP) 2013 – 2017', to implement the NCCRS (Republic of Kenya, 2013a). The development of this action plan was a logical next step to enable Kenya to reduce vulnerability to climate change. It also aimed to improve the country's ability to take advantage of the opportunities that climate change offers. Its primary concern was to achieve a long-term sustainable economic growth up to and beyond 2030. NCCAP 2013 – 2017 considered climate change a cross-cutting issue that should be mainstreamed in all the sectors of the economy. To achieve this, the second Kenyan Medium-Term Plan (2013 – 2017) provided for the incorporation of climate change programmes into the national development plans, building on both the NCCRS and its Action Plan, the NCCAP (Republic of Kenya, 2013b). The Kenyan Medium-Term Plan (2013 – 2017) further cautioned that a growing population and an economy with urbanization together increase greenhouse gas (GHG) emissions. The policy document therefore advocates for strategies that ensure that Kenya remains a low GHG emitter as it develops green jobs. It is however silent on how universities in Kenyan should act to prepare students for green jobs that are characterised by reduced consumption of energy and raw materials, limited GHG emissions, minimized waste and pollution and protective and/or restorative of ecosystems.

Building on the NCCRS and the NCCAP frameworks, the country later developed the Kenya National Adaptation Plan (NAP) 2015 – 2030. The NAP aims to 'consolidate the country's vision on adaptation supported by macro-level adaptation actions that relate with the economic sectors and county level vulnerabilities to enhance long term resilience and adaptive capacity' (Republic of Kenya, 2016a, p.1). It proposes,

- mainstreaming of climate change adaptation into County Integrated Development Plans (CIDP) and other county plans;
- enhancing the implementation of an energy generation plan that increases the resilience of the energy systems to the impacts of climate change;
- supporting innovation and development of appropriate technologies and capacity that promote climate-resilient development;
- and mainstreaming climate change adaptation in education (formal, non-formal and informal) and training (Republic of Kenya, 2016a, p. 29).

NAP, like the NCCRS, recognizes the need to integrate climate change matters in education at all levels. What NAP does not provide for is the extent and form of mainstreaming of adaptation measures in education. The first pointer on what the government envisioned as the role of education in climate matters came in 2016 when the country enacted a Climate Change Act to provide a legal framework for the implementation of climate change adaptation and mitigation actions. The Act provides for the establishment of a National Climate Change Council to coordinate the implementation of the Act (Republic of Kenya, 2016b). The Council is mandated to provide policy direction on research and training on climate change which implies the

need to establish linkages between government agencies, and research institutions and universities, and the important role of universities in generating knowledge to address the challenges of climate change.

Upon expiry of NCCAP 2013-2017, the National Climate Change Action Plan (NCCAP) 2018 – 2022 was developed to further Kenya's development goals by providing mechanisms and measures to achieve low carbon climate-resilient development (Republic of Kenya, 2018b). This plan offers a framework for Kenya to deliver on its nationally determined contribution. NCCAP 2018-2022 guides the climate actions of the National and County Governments, the private sector, civil society, and other actors as Kenya transitions to a low carbon climate-resilient development pathway. However, NCCAP 2018-2022 does not provide specific guidance on the climate actions for the education institutions such as universities in ensuring a low carbon climate resilient development pathway.

This section has focused on policies put in place by the government of Kenya to address climate change. The reviewed policy documents confirm that Kenya has laid a range of policies dealing with climate change. The role of higher education institutions in climate change action is, however, either silent in many of the documents or mentioned lightly without clear indicators of its contribution. This section is heavy on policies that seek to guide adaptation measures which, according to Symons (2014), Kenya's political elite perceive as a reduction of risks to economic growth and enhancing of opportunities to gain revenue from international funding sources. Symons' study critiques the depoliticisation of climate change adaptation by promoting discourse on alternative environmental futures other than that which is limited to technical and economic spheres. The author recognises the need for a conversational construction of a particular vision of transformation aimed at keeping equity and justice at the centre of the climate debate. Further there is need for this discourse to reflect more on the role of knowledge creation and dissemination in not only adaptation but also mitigation measures.

2.1 Implementation of climate change policies

The Constitution of Kenya 2010 does not explicitly mention climate change. However, it provides ground for the formulation and implementation of adaptation and mitigation legislation policies (Republic of Kenya, 2010b). It offers strategies for mitigating climate change and guaranteeing a clean and healthy environment to Kenyan citizens. The principal instrument of government for the management of the environment is the Environmental Management and Coordination Act (EMCA) of 1999 (Republic of Kenya, 2012a). It provides for the relevant institutional framework for the coordination of environmental management through Kenya's National Climate Change Action Plan II. It also includes the establishment of the National Environment Management Authority (NEMA), which is the designated national authority for the clean development



mechanism and the national implementing entity for the adaptation fund.

The Water Act of 2002 provides the overall governance of the Water Sector. The regulations and strategies following from the Water Act recognise the climate change implications on health, sanitation, and water (Republic of Kenya, 2017). The Energy Policy of 2004 and the Energy Act of 2006 are the other key documents relating to climate change in Kenya. Kenya's energy policy of 2004 encourages the implementation of indigenous renewable energy sources to enhance the country's electricity supply capacity. The strategy is implemented through the Energy Act of 2006, which provides for mitigation of climate change issues through energy efficiency and promotion of renewable energy. The Agricultural Sector Development Strategy 2010-2020, on the other hand, promotes sustainable food production and agroforestry while the Kenya Forestry Master Plan 1995-2020 provides an overarching framework for forestry development in the country. The Masterplan is the blueprint for reforms in the sector birthing the Forest Act of 2005 and the Forest Policy of 2007. It recognises the environmental role of forests in ensuring access to water, maintaining biodiversity, carbon sequestration, among others.

The Vision 2030, Kenya's national development blueprint, under its social pillar, aims to have a just and cohesive society enjoying equitable social development in a clean and secure environment. In its second medium-term plan, it provides for mainstreaming of climate change in national planning by identifying actions to address climate change. It provides a target for planting at least 7 billion trees to address food, water and energy security. The vision summarises flagship programmes and projects, such as the Integrated National Transport Policy (2010), that provides for transport solutions with aspects of climate change adaptation and mitigation (Republic of Kenya, 2007). Moreover, Vision 2030 envisions the National Policy for the Sustainable Development of Northern Kenya and other Arid Lands, which focuses on climate resilience and strengthens livelihoods. The National Policy for the Sustainable Development of Northern Kenya and Other Arid Lands also seeks an enabling environment to accelerate investments in foundations to reduce poverty and build resilience and growth (Republic of Kenya, 2012b). The policy recommends the establishment of the National Drought Management Authority (NDMA), the National Disaster Contingency Fund, and the Council for Pastoralists. Further, the National Disaster Management Policy of 2012 institutionalised disaster management and mainstreamed disaster risk reduction in the country's development initiatives. This policy aims to increase and sustain the resilience of vulnerable communities to hazards.

The NCCRS 2010 however established that institutions that were in the Ministry of Environment and Natural Resources mandated to govern climate change affairs were inadequate (Republic of Kenya, 2010a). They lacked legal frameworks and environmental policies dealing explicitly with climate change. This gap was subsequently addressed through the National Climate Change

Action Plan (NCCAP) 2013 – 2017 that recommends a standalone policy and legal framework for climate change (Republic of Kenya, 2013a). The National Climate Change Act of 2016 was thus developed to provide a regulatory framework for enhanced response to climate change, as well as mechanisms and measures to achieve low carbon climate development (Republic of Kenya, 2016b). Section 9 of the Act establishes directorate of climate change as a principal agency of government on national climate change adaptation and mitigation. Under section 25, the Act provides for a financing mechanism prioritising climate change actions and interventions. The Public Finance Management (climate change fund) Regulation 2018 operationalises this section of the Act by establishing climate change fund and advises its usage in activities such as training, research and innovation. In a report to review progress on climate change fund budget in financial year 2018/19, two-thirds of investment in climate change interventions were found to be on adaptation (Republic of Kenya, 2019b). Republic of Kenya (2019) report also notes that the high poverty levels and reliance on climate change investments are the key drivers of vulnerability to climate change in Baringo, Kisumu, Laikipia and West Pokot counties in Kenya (Republic of Kenya, 2019b). In these four counties, investment in forestry and alternative energy sources were identified as the main mitigation strategies that were financed by a third of the climate change investment fund.

Lessons learnt from the country's NCCAP 2013 – 2017 which encouraged the mainstreaming of climate change issues and efforts in the relevant sectors, like the focusing on adaptation and mitigation actions on agriculture, clean energy, biodiversity conservation and use, disaster risk reduction and addressing issues of vulnerable groups in communities guided the development of the Green Economy Strategy and Implementation Plan (GESIP) 2016-2030 and the NCCAP 2018 – 2022 (Republic of Kenya, 2016c). GESIP emphasises the need to re-orient education and training to ensure inculcation of green economy tenets which address issues of climate change. The GESIP report highlighted weak and ineffective environmental regulation enforcement; inadequate information about green technologies; constraints in accessing financial resources; and gaps in human capacity and skills in green economy aspects as some of the challenges to effective implementation of green economy strategy (Republic of Kenya, 2016c). Solutions to these challenges require, among others, collaboration with academia and centres of excellence like the universities. It encourages collaborations with the academia and scaling up of the best practices at County level on existing indigenous knowledge (Republic of Kenya, 2016c). Even though clear gaps in skills and human capacity are identified in the GESIP report, a guide to the solutions is lacking and thus leaving universities with the choice of whether or not to fill the gap and the form that these initiatives should take. The NCCAP 2018 – 2022 which guides climate actions of the National and County governments, the private sector, civil society, and other actors as Kenya transitions to a low carbon climate-resilient development pathway is also silent on the responsibility of university education in the success of low carbon and climate-resilient development.

2.2 Climate change policies and implementation challenges and successes

A review by Mutimba and Wanyoike (2013) on the environment and climate change revealed that relevant policies in Kenya were disjointed, and not integrated with long-term national development plans and strategies. Policies at the sector level and laws relating to the environment were not consistent with both the country's Constitution and Environmental Management and Coordination Act (EMCA) of 1999. The authors further recommended policies balancing increased productivity and reduction of GHGs. Additionally, Ongugo et al. (2014), in a review of Kenya's policies relevant to climate change adaptation and mitigation, found that the country's climate change adaptation and mitigation policies were at a formative stage. Their review, which included a range of cross-cutting national policies, identified overlapping sectoral policies such as agriculture, energy, and forestry, which they reported to be poorly integrated and lacking in research and evidence-based policy formulation or decision making. The authors reported that the reviewed policies did not adequately address the vulnerability of communities or their exposure, resilience, and adaptive capacity to the impacts of climate change. A study by Francis et al. (2016) in Turkana County, one of Kenya's counties intensely impacted by climate change and experiencing long periods of cyclical droughts (Human Rights Watch, 2015), for instance, established that the perception of climate change was significantly associated with the gender of the household head, livestock ownership, and herd size. The study thus recommended that, as a prerequisite for a long-term commitment to the household's climate resilience, policies and programmes should aim at improving these factors. They opined that the impacts and costs of climate change need to be addressed through coherent and effective climate change governance taking into account the vulnerability of communities. Some improvement has since been recorded. Parry's (2016) review on current and planned adaptation action in Kenya noted efforts made in establishing a comprehensive policy framework to guide and respond to climate change. The review also found that Kenya is implementing adaptation actions that reduce the vulnerability of its agriculture, livestock and water sectors, especially in arid and semi-arid lands (ASALs). Parry (2016) recommends greater efforts in increasing attention to climate change, through strengthening of the county government capacity and knowledge development among communities of practice. The knowledge development aspect is a significant responsibility of universities, yet their efforts and expectations are less pronounced in the national policy framework.

Studying the implementation of the NCCAP 2013 – 2017, Murphy and Chirchir (2017) found that substantial progress had been made on the implementation of mitigation actions. They established a good pace towards the long term 2030 GHG emission reduction goals, and in the six priority mitigation areas. They admitted though that data collection was not yet at a point that enabled calculation of the emission reductions. Chaudhury et al. (2020), on the other hand, reported that Kenya had made

considerable progress in building resilience through its National Adaptation Plan at the national level. The authors noted that the government is currently supporting local efforts to mainstream adaptation into County Integrated Development Plans (CIPDs) by establishing County Climate Change Funds (CCCFs). While analysing the progress made in mainstreaming adaptation into five counties' CIPDs, Chaudhury et al. (2020) identified two local governments, Makueni and Wajir, that had emerged as early leaders. Adaptation interventions in Makueni and Wajir counties resulted in resilient development benefits such as improved access to water. Notwithstanding benefits associated with mainstreaming of climate adaptation into development, Summerlin et al. (2020) points that an implementation gap persists in the local efforts to mainstream adaptation into CIPDs noting a disconnect between the development plans and sectoral policies on paper, and practice in the grassroots communities. According to Summerlin et al. (2020), three lessons can be learned from the mainstreaming of climate adaptation into development in Kenya i) incentivized mainstreaming enables action to take place, ii) local leadership builds support for adaptation, and iii) stakeholders' inclusivity addresses local vulnerabilities. The authors underscore the critical role that access to finance, robust stakeholder engagement, and capacity building play in advancing the implementation of climate-resilient, sustainable development initiatives.

Marigi (2017) employing both a desk review of the journals, articles, case studies, projects, programmes undertaken in the country including policy and regulatory documents, and online interviews with 47 County directors of meteorology and County heads for environment in Kenya, established the ineffectiveness of the Kenyan policies and capabilities in addressing the vulnerabilities of climate change hazards. The author found that the entire country was vulnerable with northern parts and the southern tip of the coastal strip being the most vulnerable. Marigi thus recommended enhancement of human capacity both at the technical and community level to monitor climate parameters and incidences of natural disasters. Interestingly, a joint study between Bielefeld university, FIAN Germany, Kenya Youth Foundation and CEMIRIDE in Tana Delta in Kenya showed negative impacts of climate change policies on fundamental human rights of the local population. The study observed that in keeping with the agrofuel production policies using reforestation, evictions were frequent, resulting in deprivation of the local community's crucial livelihood assets, and compromising human security.

Studies show a weak link between documented implementation practice of the variety of policies that seek to address climate change matters, both sectoral and national, and the actual implementation practice. The reviewed literature demonstrates an overlap and disconnect between policy and practice. While some policies recommend integration of climate change education in higher institutions with an aim of providing positive impact on community engagement in addressing climate change issues, they fail to provide clear guidelines on mainstreaming. Universities therefore remain less engaged in implementation of these policies. The following section looks at university policies and actions on climate change. The analysis of the policies revolves around efforts in curriculum, research and campus greening activities.



3.0 University policies and actions on climate change

Kenya prioritises investment in university education in line with Vision 2030 (Republic of Kenya, 2020), the country's development blueprint covering years 2008 to 2030. The vision seeks to transform Kenya into an industrialising middle income country providing high quality of life to all citizens in a clean and secure environment. A policy framework for reforming education and training for sustainable development that is anchored in the Vision 2030 tenets highlights one of the Kenyan university education objectives as promotion of research, innovation and application of innovation to development and contribution to community service (Republic of Kenya, 2019). However, in comparison, African countries lag in their drive toward knowledge-based economies that certify sustainable development as expressed by Asongu and Odhiambo in their 2019 systematic policy review. The review covered policies and strategies with which African countries can accelerate knowledge-based economies certifying sustainable development in their countries. The authors concluded that African countries ought to tailor their policy measures to achieve quality education and build a knowledge economy out of the ever-growing population.

Despite the recommendations, quality of higher education has been of concern. McCowan's (2018) study on quality of higher education in Kenya, addressing the conundrum, noted the limited impact of the national and institutional drives for quality in the Kenyan higher education. The study identifies resources, governance and pedagogical culture as primary barriers to enhancing quality in higher education in Kenya. Poor quality of provision and ineffective governance make it harder for universities in Kenya to attract funds (McCowan, 2018). It recommends reforms in policy and practice to address the material conditions of universities, the institutional organisation forms and the cultural relations of teaching and learning. Improving quality of university education would certainly lead to its response to societal needs including sustainable development.

A national climate change framework policy developed in 2016 to facilitate a coordinated, coherent and effective response to local, national and global challenges and opportunities presented by climate change posits that the government shall mainstream climate change in curricula of basic, secondary and tertiary level education. It envisages linkages between government and other actors like academia, civil society and global climate change innovation institutions amid an absence of elaborate implementation framework. The policy recognises the importance of devolved governments in climate change adaptation and mitigation. Whereas it is clear in its recommendation for the establishment of institutional framework to coordinate and enhance mainstreaming adaptation, mitigation measures and elaborate linkage of climate change data with national and county planning process, it does not pronounce itself nor provide clear recommendations on how universities should be linked in the planning process and generate and dissemination of the said data. The National Climate Change Act of 2016, in the same year, further establishes a climate change council, headed by the president and composed of nine members in which academia is represented by a nominee of Commission for

University Education. It provides that the formulation of climate change-related plans be informed by scientific knowledge and technological innovation. Section 21 provides for the integration of climate change into curricula and spells out in (2) that the Council shall advise public agencies responsible for regulating university education on the integration of climate change into university curricula.

Implementation of the instituted national climate change policies through higher education institutions is especially critical for the achievement of sustainable development. Higher education responses to climate change issues through provision of appropriate educational infrastructure and relevant knowledge and skills are needed. A bigger percentage of Kenya's population comprise of young people (Republic of Kenya, 2019a) and thus the need to equip the next generation with climate change knowledge and skills for sustainable development through the curriculum, research and community services.

Accelerated efforts need to be employed in respect of policy-making at the universities to encourage the integration of climate matters in the training of future professionals. Leal Filho et al. (2019) suggest that policy-making on climate change should address issues related to vulnerability, especially for poor communities, since they suffer most from the climate change impact. To this end, deliberations as a follow-up to the World Student Summit for Sustainability and the International Day for Biodiversity celebration in 2014 championed the Kenya Green University Network (KGUN) proposal (UNEP et al., 2014). The proposal aimed at developing a functional network of higher education institutions that would incorporate environment, low carbon-climate resilience development strategies and sustainability aspects in their education, training, campus operations and enhanced student engagement. It was born out of an informal meeting of more than 20 representatives, of the National Environment Management Authority (NEMA-Kenya) and universities. The informal meeting which sought to assess current and emerging environmental sustainability trends in higher education, proposed institutional efforts including energy saving, water harvesting, afforestation and environmental protection and conservation initiatives.

Launched in 2016 at the UNEP headquarters in Nairobi, Kenya Green University Network started by recommending that the universities establish governance structures of university-community engagement, create a green student office fostering good habits, providing resources and driving policy changes (UNEP, 2016). Further, universities in Kenya were encouraged to ensure linkages with regional and global networks, such as the Global Universities Partnership on Environment for Sustainability. Universities were also urged to invest in the human capacity to achieve the Sustainable Development Goals (UNEP, 2016). Besides, the launch formalised a national network that brought together Kenya's 70 higher education institutions to incorporate environmental and low-carbon-climate resilience development strategies in higher education. The system encourages the incorporation of sustainability aspects in higher education, training, campus operations and student engagements (UNEP, 2016).

Climate change is indirectly addressed through environmental education in Kenyan universities. Mungai (2017), in his study tracking environmental sustainability, however, observed that sustainability targets in universities in Kenya were more of a government requirement than universities' genuine desire to reduce their ecological footprint. The researcher evaluated data and information from the quarterly reports submitted to the NEMA-Kenya by the Kenyan universities for the period 2012-15. In his study, Mungai (2017), concluded that universities should not only be encouraged but also empowered to play their role in sustainability planning, and to have environmental sustainability policy as well as constitute committees to oversee its implementation. Oloo and Omondi (2017), seeking to demonstrate the strength of local institutions as centres for climate change resilience, highlighted factors affecting smallholder investment in natural resource management such as land. They highlight how the local institutions can be strengthened in their resilience to climate change effects. The review established that there is little engagement of universities in climate change matters, and their policies on the same are not elaborated. It recommends increased involvement of universities in solving climate change-related issues at the local level.

One effort in incorporating sustainability efforts is the inclusion of content on climate change among other critical issues in the policy frameworks for education for sustainable development (ESD) (Republic of Kenya, 2017a). Further, the country has domesticated global frameworks and conventions that support ESD into its constitution and other legislation leading to establishment of the Regional Centres of Expertise (RCEs) to enhance the implementation of ESD. Teachers and education officials have since been trained, and a significant number of schools are already practising ESD. Despite this achievement, the concept of ESD is not yet fully understood. Inadequate partnerships amongst ESD stakeholders, limited research, innovation, and disconnect between ESD research and industry needs are listed among the challenges experienced in implementing the ESD policy frameworks (Republic of Kenya, 2017a).

3.1 University curricula and climate change

The NCCRS (2010) proposes the incorporation of climate change information into schools and colleges' curricula and syllabuses as a way of enhancing climate change education and awareness (Republic of Kenya, 2010a). Relating to the NCCRS (2010) proposal, the Kenya Green University Network at the launch recommended an online/blended course on sustainability to be mounted for all students (UNEP, 2016). The recommended course on sustainability included climate change content at all levels.

Kariaga et al. (2013), employing the unit-based sustainability assessment tool (USAT) at Masinde Muliro University of Science and Technology (MMUST), Kenya to establish the extent to which the university integrated sustainability content in teaching, found that overall, the university performance rating on integrating sustainability content to the teaching was 50.6%.

It thus recommended resource mobilization by the university to ensure increased sensitisation and integration of education for sustainable development content to the teaching. Years after Kariaga et al. case study, Ndegwa's (2018) case study of the Kenyan universities on aligning higher education curricula with the green concept indicated that 83% of all Kenyan public and 12% of the private-chartered universities offered environmental and sustainability-related courses (Ndegwa, 2018). More, Ndegwa's study noted that only a few of the public universities had made efforts to mainstream environment and sustainability issues into their teaching and learning processes. The study by Ndegwa recommends regular review of university curricular content to address current trends in the discipline in focus. These revisions should thus provide an opportunity for the introduction of new courses that incorporate environment, low carbon-climate resilience development strategies and sustainability aspects in education, training, campus operations and enhanced student engagement. It further recommends advancement of the agenda of education for sustainable development through policy support, building capacities of educators and trainers.

Other studies have established that efforts to integrate sustainable development in African universities' curricula and their community engagement processes face challenges such as policy gaps on vital teaching strategies for sustainable development and inadequate funding of research and technology development (Nyerere et al., 2015). Musarurwa (2012), examining the concept of universities' community engagement in climate change education, noted that communities were not only geographical but also virtual thus the need to ensure that climate change is integrated and infused into the curriculum reflecting this reality. Virtual communities, according to Musarurwa (2012), are either formal or informal. They exist in the mental spaces, and they represent professional organisations such as the town planners, industrialists, farm unions, opinion leaders, among others. They are also communities based on interests such as conservationists. Musarurwa further acknowledged the possibility of the universities benefiting from their communities through the adaptation of indigenous knowledge into the curricula.

A climate change knowledge gap in Kenyan education system survey carried out in two public universities established that the majority of the students who participated in the survey, 96.3%, were aware of the climatic change patterns (Huho, 2015). Their knowledge, though, was limited to afforestation and reforestation as the mitigation strategies to climate change. The study revealed that despite the student knowledge of the climatic change and its implications, only 7.4% of the students were in agreement that climate change education should be integrated into the university curricula. Curiously, 33.3% of the students thought that the course should be taught at the primary level only (Huho, 2015). At primary levels, Wildlife Clubs of Kenya (WCK), are deemed the largest environmental education organisations for youth in Africa (McDuff, 2000). Documentation on the key achievements made by WCK revealed the existence of partnerships between motivated individuals and conservation organisations, the involvement of youth in high-profile environmental issues, and student trips



to national parks which impact their career choices. The study by McDuff (2000) recommended that WCK should adapt to changing environmental issues to enhance its effectiveness in environmental education. In his blog article, Huho (2019) points that climate change is concentrated in primary education curricula while it is taught in optional subjects in secondary and university education curricula. The findings echo Kariuki's (2012) findings which established only students taking geography were exposed to climate change content at secondary education in Kenya. Huho (2019) thus recommends a multidisciplinary approach of integrating climate related content in the university curricula that targets all learners. Padgham et al. (2013) on their part recommend that university research should strengthen teaching and address climate change issues, enabling an effective interaction among scientists from different disciplines and between communities of policy and practice.

3.2 University greening approaches in Kenya

Public and private universities have adopted some forms of greening approaches in their operations. Bring Your Own Device (BYOD) is one such approach that involves green computing through the use of the same information and technology devices for personal and office work (Ndunge et al. (2017). Adoption of such an approach in higher education institutions reduces carbon emission, electricity consumption and waste in the lifecycle of the information and technology devices. The 3R concept (Reuse, Recycle or Recover) for management of the solid waste is another approach in greening of campus operations (Talsania & Modi, 2019). The approach requires provision of awareness programmes and waste reduction courses in the educational buildings for youth in higher education institutions. A case study of technical and vocational education and training (TVET) institutions on issues affecting the greening of their programmes for sustainable development in Kenya established that there was insufficient integrated sustainable development content training (Were and Ahmed, 2018). They noted that the promotion of technical skills for a transition to a greener economy in learning institutions require enhanced policy on the integration of sustainable development into training.

Some universities are working to reduce on fuel emissions (Munene, 2019; Saur, 2017). Strathmore University, one of the Kenyan chartered private universities, and Kenyatta University, a public institution, have the largest solar installation in the region with 600KW and 100KW solar power plant respectively. The investment of these institutions in renewable energy confirms that universities can demonstrate leadership in mitigating climate change. However, a review of Ministry of Environment, Acts of Parliament, Kenya Green University Network (KGUN) and institutions that underpin extent of Green Human Resource Management (GHRM) practice implementation in Kenya reveal that greening human resource management practices remain a new concept in Kenya (Chemjor, 2020). Chemjor states that in most institutions of higher education both private and public, greening practices in the work environment and service delivery

are yet to be realised adding that appreciation of GHRM practice needs to focus on the demystification of the practices and training. There are increased calls for universities to establish innovative solutions to challenges brought up by climate change (Nakweya, 2019). A study by Coy et al. (2013), which employed path analysis to establish the level of commitment to the environment and student support for 'green' campus initiatives, confirmed that students who recognised their interdependence with the environment exhibited much dedication to the green campus initiatives. The study revealed that the commitment model predicted college students' endorsement of hypothetical 'green' campus initiatives. The NCCRS (2010) recommends online blogging through Facebook, Twitter, Google Groups, Yahoo Groups, and Unite for Climate to discuss climate change and mitigation efforts (Republic of Kenya, 2010a). The social media approach indeed targets the higher education institutions, particularly the students, as they regularly use the platforms.

4.0 Conclusion

The reviewed literature has shed light on the policy environment in Kenya regarding climate change, and the national and institutional mitigation and adaptation strategies in place. It reveals the impacts and challenges of climate change as experienced in various sectors of Kenya's economy including agriculture, tourism, health and education. This review acknowledges government efforts in the climate change policy formulations and the diverse climate action strategies put in place.

Government policies on climate change in Kenya are found to address climate change issues in specified sectors. The various policies draw from the global declarations like UNFCCC and the Paris Agreement, and are anchored in the constitution and the country's development blueprint Vision 2030. Whereas the government of Kenya has put in place several policies to address the consequences of climate change, universities lag in coming up or adopting the policies. A number of the national policies and climate action strategies acknowledge the potential of university education in providing solutions to the climate change issues through teaching, research and community service. There is notable silence however on the role of universities or their involvement in the governance of climate change affairs. The literature on how climate change is represented in the Kenyan universities' curricula, campus activities, institutional governance and community engagement work is scanty and, in most cases, lacking. The literature is also silent on how Kenyan universities' students, lecturers and communities are involved in the co-construction of ideas around climate change.

Notwithstanding, some efforts have been put in place by Kenyan universities with the aim of ensuring sustainable development. Both public and private universities, for instance, participated in coming up with the 'Kenya Green University Network (KGUN)' to implement greening approaches in the universities. The efforts are however still lacking in many aspects. For example, sustainability targets by universities in Kenya have been reported to be more of a government requirement than the universities genuine desire in

ecological footprint reduction. Besides, a number of studies reviewed confirm that climate change content was treated casually at all levels of education system (Kariuki 2012). Further, few Kenyan universities have made efforts to mainstream climate change related issues in their sustainability development plans, and to green their campuses.

The major gap in having university participation in climate change action in Kenya is seen in the weak link between national and institutional policies. Even though there is an elaborate policy framework at the national level, there is no evidence of institutional policies targeting climate change mitigation and adaptation strategies in curriculum or campus greening activities that draw from the national policy framework.

Sensitising universities on national policies to address the consequences of climate change will aid universities in adopting the policies and positive transformation of their perspective in ecological footprint reduction. It could also help universities to formulate and integrate policies that address climate change issues into their sustainable development plans. The national government needs to provide clarity on the role universities should play in the governance of climate change affairs and provide climate change research funding to the universities. Increased financing will empower universities in Kenya to mainstream climate change activities into curricula, campus activities, institutional governance and community engagement work.



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Abbreviations

ASALs	arid and semi-arid lands
BYOD	Bring Your Own Device
EMCA	Constitution and Environmental Management and Coordination Act
CCCFs	County Climate Change Funds
CIDP	County Integrated Development Plans
ESD	education for sustainable development
EMCA	Environmental Management and Coordination Act
GESIP	Green Economy Strategy and Implementation Plan
GHG	greenhouse gas
GHRM	Green Human Resource Management
ITCZ	Inter-Tropical Convergence Zone
KGUN	Kenya Green University Network
NAP	National Adaptation Plan
NCCRS	National Climate Change Response Strategy
NCCAP	National Climate Change Action Plan
NDMA	National Drought Management Authority
NEMA	National Environment Management Authority
RCEs	Regional Centres of Expertise
TVET	technical and vocational education and training
USAT	unit-based sustainability assessment tool
UNFCCC	United Nations Framework Convention on Climate Change United Nations Environment Programme
WCK	Wildlife Clubs of Kenya





Climate-U

Transforming Universities
for a Changing Climate

About Transforming Universities for a Changing Climate

Climate change is the most significant global challenge of our time, and many of its effects are felt most strongly in the poorest communities of the world. Higher education has a crucial role to play in responding to the climate crisis, not only in conducting research, but also through teaching, community engagement and public awareness. This study contributes to our understanding of how universities in low and middle-income countries can enhance their capacity for responding to climate change, through a focus on the cases of Brazil, Fiji, Kenya and Mozambique. In doing so, it contributes to the broader task of understanding the role of education in achieving the full set of Sustainable Development Goals.

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