



Aidan G. Msafiri

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# **CLIMATE JUSTICE, RESILIENCE, AND PLANETARY REGENERATION**

**(A Compendium for Africa)**



UNIVERSITY OF GRAZ

Research Center for Climate Law  
(ClimLaw: Graz)



# **Climate Justice, Resilience, and Planetary Regeneration**

## **A Compendium for Africa**

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***Rev. Dr Aidan G. Msafiri***

***Moshi, March 2026***

*Dedication*

To all university students, environmentalists, and academia engaged in the climate justice and action discourse in and across Africa.

## ***Foreword***

A compendium of climate justice, eco-resilience, and regeneration for Africa is a well-timed, critical, and urgent model for the survival of humanity, biodiversity, and resources, locally and globally. Climate change disasters, challenges, risks, vulnerabilities, and uncertainties are commonplace and are hitting the African continent more than ever before. These are skyrocketing both in magnitude and frequency. Ironically, scientific facts and figures indicate that Africa is the only continent which relatively “contributes” hitherto least CO<sub>2</sub> emissions and Greenhouse Gases, which largely cause climate change, climate injustices, planetary non-resilience, and global warming.

Nonetheless, Africa remains the most vulnerable continent, particularly to the impacts of the Anthropocene and the destructive consequences of climate change. Undoubtedly, these eco-threats and injustices have far-reaching socio-economic, existential, environmental, political, infrastructural, nutritional, human, biological, educational, cultural, and technological consequences and risks across short-, medium-, and long-term trajectories. These are “wake-up calls” for a new climate justice, resilience, and planetary regeneration, particularly grounded in a collective African discourse on awareness and responsibility. It particularly envisages unleashing a future of eco-fitness and eco-sustainability, with and for Africa and the entire globe. Among others, this urgent project calls for a critical and new rethink in our collective vision, dream, and action towards a trans-formative and practical “African-grown” climate justice, resilience, and planetary regenerative model solution, not only for climate change “gurus”, academia experts, and policymakers, but for everyone present and future.

To underscore the severity and complexity of the climate injustice emergency, Ripple (2019) and colleagues (2020) called for a climate emergency gathering, which garnered more than 11,000 signatures from climate scientists in 153 countries.<sup>1</sup> Among other indicators, they provided quantitative and qualitative data on alarming developments linked to climate-related disasters worldwide.

It is time for Africa in particular, to develop an integral and resilient climate justice and eco-sustainability framework or syllabus especially by addressing the salient nexus and interdependency between: “*oikos*” (earth), “*oikologia*” (ecology), “*oikonomia*” (economy), and “*oikumene*” (ecumenism) for sustainable, resilient, and regenerative livelihoods of every creature for thousands of years to come.

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<sup>1</sup> Cfr. Bioscience, September 2021/Vol. 7 No. 9.

Larry Rasmussen (2000:525) re-echoes this change-based approach by elucidating radical transformations necessarily embedding eight major transitions: “*an economic transition that lives off nature’s “income” instead of “capital” and builds into all economic activity, including the cost of goods, that which is required for nature’s regeneration and renewal indefinitely; a social transition to a far broader sharing of nature’s income and human wealth, together with increased opportunities for sustaining and sustainable livelihoods for all; an institutional transition that combines greater cross-national cooperation in order to address global problems with greater attention to what makes for sustainable local and regional communities; an informational transition in which research, education and global monitoring allow large numbers of people to understand the interrelated problems they face and offer them the means to address these problems; a demographic transition from an unprecedented population explosion to a roughly stable world population; a technological transition which effectively means minimal environmental impact per person; a moral transition to a framework that includes the societal, the biophysical and the geoplanetary – the whole Community of Life – as the arena of responsibility; and religious transition to earth-keeping as the religious calling and vocation common to all the world’s religious. These transitions in turn require their own institutional and policy vision and framework.*”

This publication, among other things, features chapters that engage with conceptual, professional, innovative, pedagogical, jurisprudential, ethical, and technological solutions toward a new, resilient, and regenerative model of justice, particularly for Africa and the world. It unpacks a plethora of critical issues and regimes related to climate justice, resilience, and cosmic regeneration. It should be noted that these are highly interconnected. Therefore, there is a need for a profound, multi- and interdisciplinary methodology and approach. Indeed, the success of this new educational compendium, depends *inter alia* on the passion, vision, thinking, and new handling of the entire climate justice regime and process especially with all key stakeholders particularly in the entire educational system levels starting with the pre-secondary, secondary, and tertiary education institutions in Africa amidst ever-worsening national, continentally, and global massive climate related risks, vulnerabilities, and challenges than ever before.

***Rev. Dr Aidan G. Msafiri***

***Moshi, March 2026***

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# CHAPTER ONE: AFRICA AND THE CLIMATE CHANGE REGIME AT THE AGE OF THE ANTHROPOCENE: A SYNOPSIS OF FACTS AND FEARS

## 1 INTRODUCTION

### 1.1 TANZANIA AND CLIMATE CHANGE REALITIES

#### 1.1.1 TEMPERATURE VARIABILITIES AND CHANGES

First, recent climatological analyses for the last decade (1991-2020) show that Tanzania has experienced unprecedented temperature increases.<sup>2</sup> Climatological evidence indicates that, in particular, over the past five years, Tanzania has warmed by at least 0.5 °C relative to the 1981-2010 baseline.<sup>3</sup>

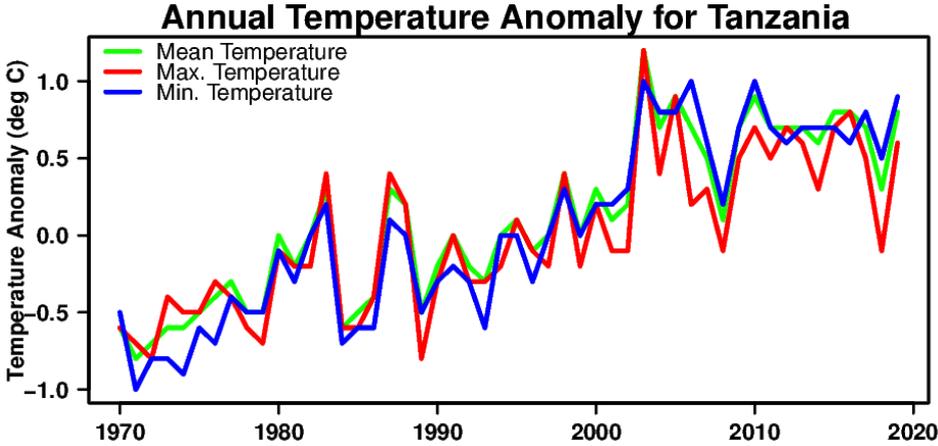


Figure 1: Annual Temperature Anomaly for Tanzania  
(Source: Tanzania Meteorological Association, 2019, 2020)

Scientifically, this ongoing warming is critical to climate variability and has devastating quantitative and qualitative consequences for many regions of Tanzania. The figures below show the mean annual maximum temperature for the Arusha region, which is both indicative and representative of similar regions.

<sup>2</sup> Cfr. Chang'a *et al.*, 2021, TMA, 2019, 2020.  
<sup>3</sup> Cfr. TMA, 2019, 2020.

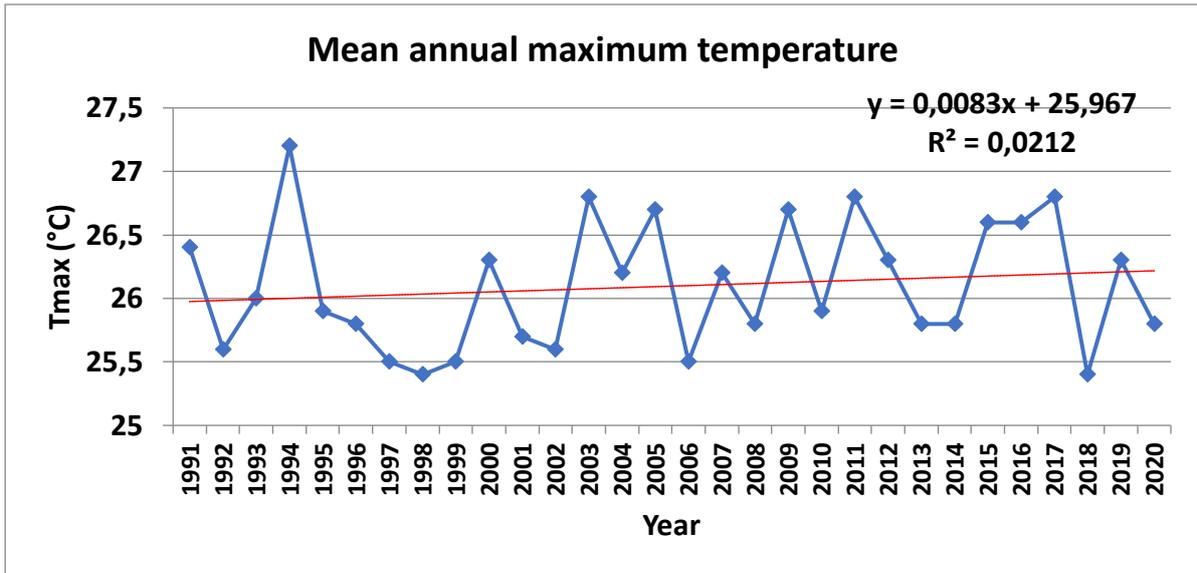


Figure 2: Mean annual maximum temperature for Arusha.  
(Source: Tanzania Meteorological Association, 2019, 2020)

Second, from the Tanzanian perspective, Ladislaus Chang’a (2021:42) indicates that in “general, the percentage of warm days (extreme high temperatures) is increasing very fast, while the trend in the percentage of cold days is decreasing rapidly”.

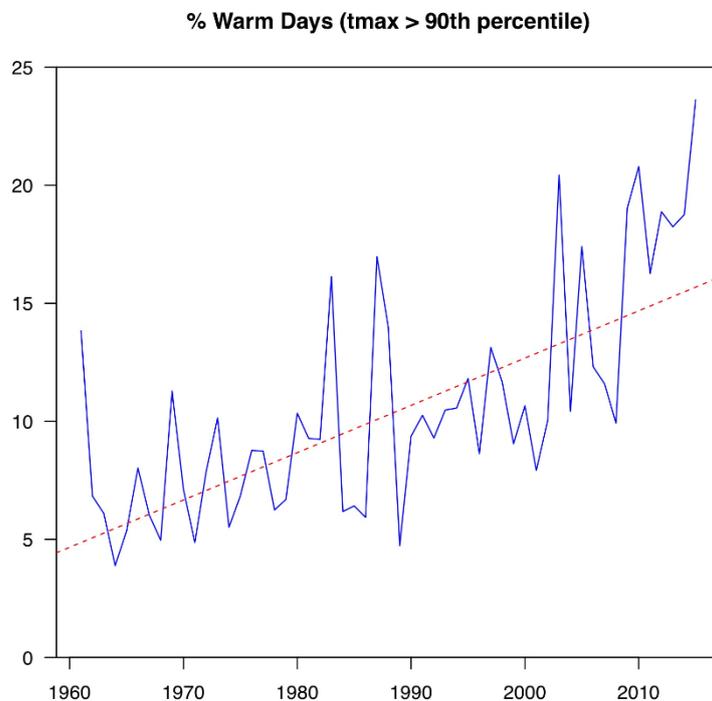
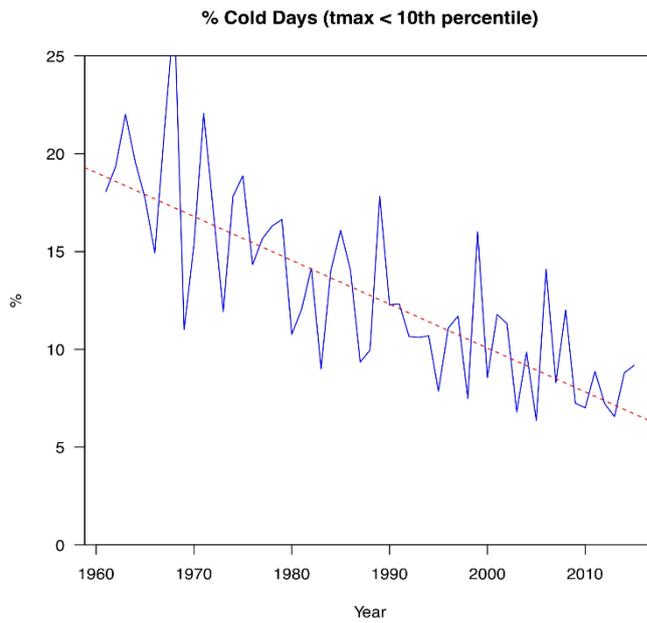


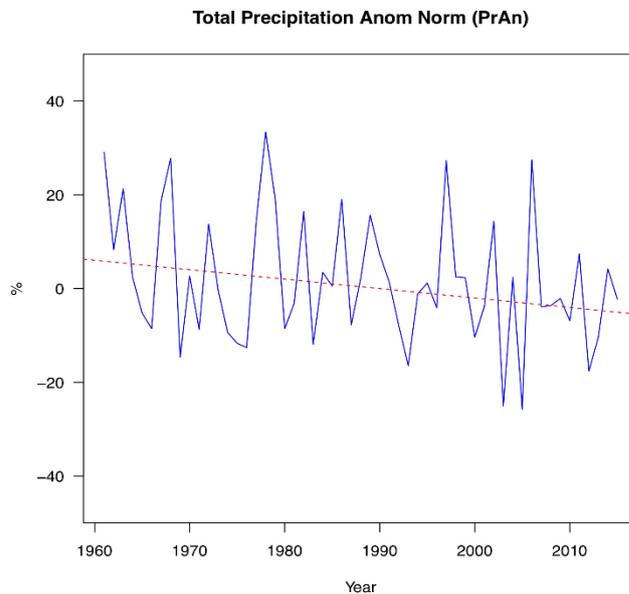
Figure 3: Trend in the percentage change in the number of warm days.  
(Source: Chang’a et al., 2021, TMA, 2019, 2020)



*Figure 4: Trend in percentage change in the number of cold days.  
(Source: Chang’a et al., 2021, TMA, 2019, 2020)*

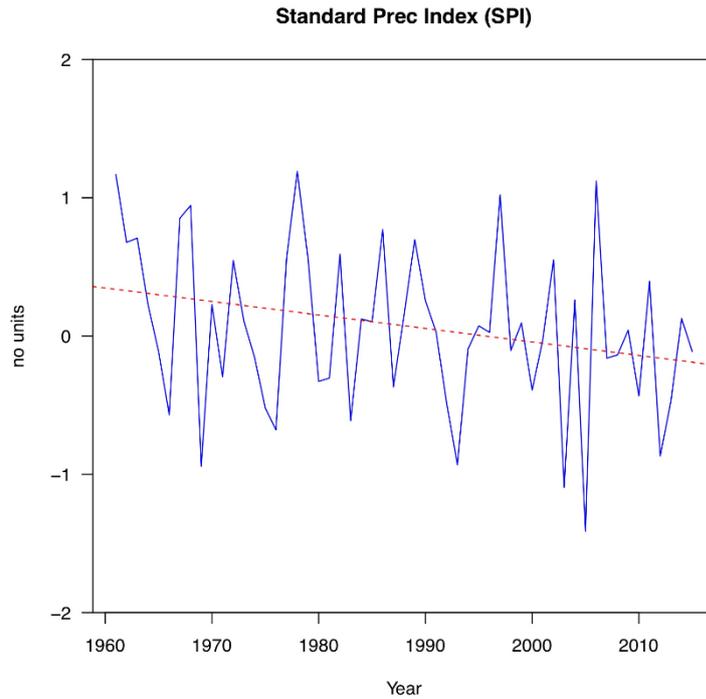
1.1.2 MEAN RAINFALL VARIABILITIES AND CHANGES

First, Chang’a (2021:50), using the Standardised Precipitation Index (SPI) and mini-annual rainfall anomaly methodologies, reports a significant decrease in precipitation during 1961-2015.<sup>4</sup>



*Figure 5. Trend in percentage change in normalised annual rainfall.  
(Source: Chang’a et al., 2021, TMA, 2019, 2020)*

<sup>4</sup> Cfr. Ibid., Chang’a 2021: 50ff.



*Figure 6: Trend in Standardised Precipitation Index (SPI).  
(Source: Chang'a et al., 2021, TMA, 2019, 2020)*

Second, it is an undeniable scientific fact that both the ferocity and magnitude of extreme weather events, particularly in rainfall variability patterns in Tanzania, are commonplace. These are in line with global rainfall scenarios (IPCC 2012, 2013, 2018, 2019; Meehl *et al.*, 2007). The following two tables, in particular, from selected unimodal stations in Tanzania, re-echo these climate-based facts and fears.

Table 1: Highest twenty-four-hour rainfall for selected unimodal stations.

ZONE	STATION NAME	LAT	LON	YEAR	MONTH	DATE	OBSERVED RAINFALL (mm)	MEAN MONTHLY RAINFALL (mm)	% of MONTHLY MEAN
SOUTH-WESTERN HIGHLAND	IRINGA	7°38'	35°46'	2011	12	15	106.9	114.7	93
				1962	12	20	102.3	114.7	89
				2016	1	10	95.4	131.3	73
				1980	1	18	88.5	131.3	67
				1989	1	4	77.9	131.3	59
	MBEYA	8°56'	33°28'	2011	12	20	89.9	181.9	49
				1997	11	30	87.6	58.4	150
				1998	2	19	83.6	161.6	52
				2017	1	24	82.6	215.2	38
				1993	1	9	80.9	215.2	38
CENTRAL	SINGIDA	4°48'	34°43'	2013	1	28	126.3	136.8	92
				2001	1	5	94.5	136.8	69
				2014	12	23	83.6	160.7	52
				2000	12	9	78.0	160.7	49
				2004	3	26	73.8	132.0	56
	DODOMA	6°10'	35°46'	1964	2	6	119.8	121.4	99
				1987	1	1	113.0	137.0	82
				1997	12	11	107.0	137.7	78
				2009	12	29	107.0	137.7	78
				2000	3	3	102.5	111.1	92
WESTERN	TABORA	5°5'	32°50'	1995	2	28	155.5	141.0	110
				2004	12	19	119.5	201.3	59
				2016	4	22	112.5	105.7	106
				1991	1	28	109.4	160.8	68
				1963	4	21	103.0	105.7	97
	KIGOMA	4°53'	29°40'	2005	1	1	141.0	148.7	95
				1995	1	28	92.2	148.7	62
				2000	11	20	86.0	143.7	60
				1999	4	5	85.1	119.9	71
				2015	2	14	84.6	90.1	94
SOUTH AND SOUTHERN COAST	SONGEA	10°40'	35°35'	1984	1	5	132.0	262.4	50
				1993	2	7	116.0	208.3	56
				1991	1	11	110.0	262.4	42
				1994	1	4	93.0	262.4	35
				1975	1	1	90.3	262.4	34
	MTWARA	10°21'	40°11'	1978	3	26	232.7	215.4	108
				1978	3	27	210.8	215.4	98
				2017	12	10	202.6	158.7	128
				1953	1	13	199.6	167.8	119
				1959	12	10	184.2	158.7	116

(Source: TMA Tanzania)

Table 2: Highest twenty-four-hour rainfall for selected bimodal stations.

ZONE	STATION NAME	LAT	LON	YEAR	MONTH	DATE	OBSERVED RAINFALL (mm)	MEAN MONTHLY RAINFALL (mm)	% of MONTHLY MEAN
NORTHERN COAST	JNIA	6°52'	39°12'	1953	11	16	167.4	110.8	151
				2011	12	20	156.4	115.2	136
				2017	10	25	153.3	71.0	216
				1991	11	25	148.9	110.8	134
				2014	4	11	138.1	251.0	55
	TANGA	5°5'	39°4'	2017	5	8	316.0	270.1	117
				1977	9	17	218.6	56.0	390
				1986	5	20	212.2	270.1	79
				1997	10	18	189.9	123.8	153
	ZANZIBAR	6°13'	39°13'	1987	5	20	188.5	270.1	70
				1979	1	30	320.0	78.9	405
				1962	4	27	247.1	412.9	60
				1962	4	28	236.0	412.9	57
				1985	4	29	234.1	412.9	57
	KIBAHA	6°50'	38°58'	1966	4	5	215.4	412.9	52
				2017	10	25	177.9	63.1	282
				1972	10	14	144.1	63.1	228
1980				10	27	133.5	63.1	212	
NORTH-EASTERN HIGHLAND	KIA	3°25'	37°4'	1995	5	27	110.7	130.1	85
				2007	11	14	105.6	87.7	120
				1978	3	24	160.0	84.6	189
				1982	10	16	147.2	23.3	632
				1976	2	16	108.6	38.5	282
	ARUSHA	3°22'	36°38'	2015	4	28	97.4	132.1	74
				1978	1	17	94.0	41.3	228
				1950	1	24	566.4	67.1	845
				1946	1	30	508.0	67.1	758
				1946	1	27	267.0	67.1	398
LAKE VICTORIA BASIN	BUKOBA	1°20'	31°49'	1946	1	28	262.0	67.1	391
				1950	1	1	231.1	67.1	345
				1994	4	30	248.2	683.5	36
				1924	4	27	172.5	683.5	25
				1923	6	2	147.7	133.0	111
	MWANZA	2°28'	32°55'	1999	11	30	140.4	413.7	34
				1942	5	21	138.4	563.8	25
				1975	3	14	158.8	160.0	99
				1962	4	5	150.9	170.2	89
				2002	12	18	148.0	151.2	98
1968	2	12	146.1	99.1	147				
2012	10	31	136.9	99.6	137				

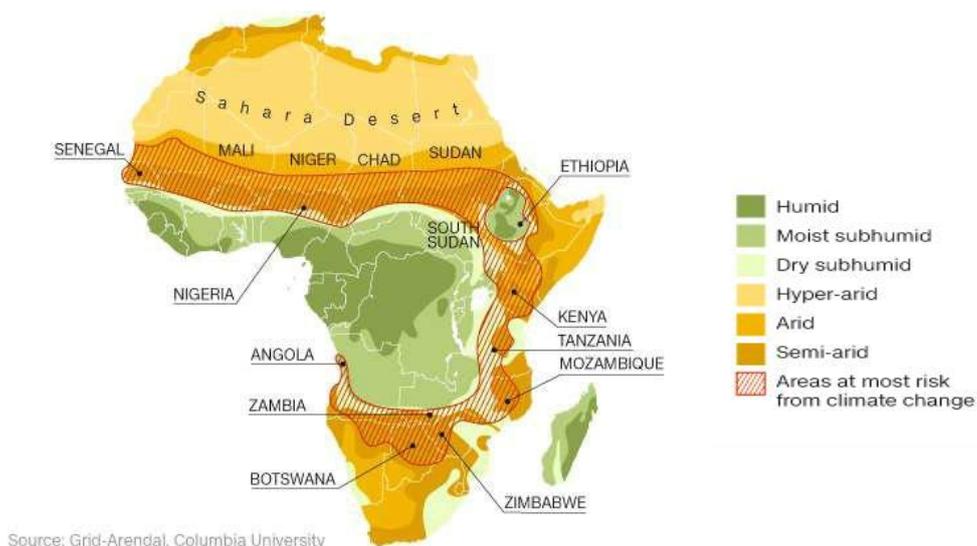
(Source: TMA Tanzania)

## 1.2 AFRICA AND THE GLOBAL CLIMATE CHANGE REALITIES

### 1.2.1 EXTREME ANTHROPOGENIC WEATHER AND CLIMATE TRENDS

First, the Fifth Assessment Report (AR5) Synthesis Report (SYR) of the Intergovernmental Panel on Climate Change (IPCC), published in 2014, confirms that the impacts of anthropogenic climate change are already being felt globally. Drawing on more than 34,000 scientific studies, the assessment documents “widespread and pervasive” effects on both human societies and natural systems arising from increasingly frequent and intense heatwaves, droughts, wildfires, storms, and floods. The report further emphasises that certain impacts are already irreversible, noting that rising temperatures are contributing to increased human mortality, widespread tree loss from drought, and extensive coral reef degradation from ocean warming, with serious implications for marine ecosystems and food security.<sup>5</sup>

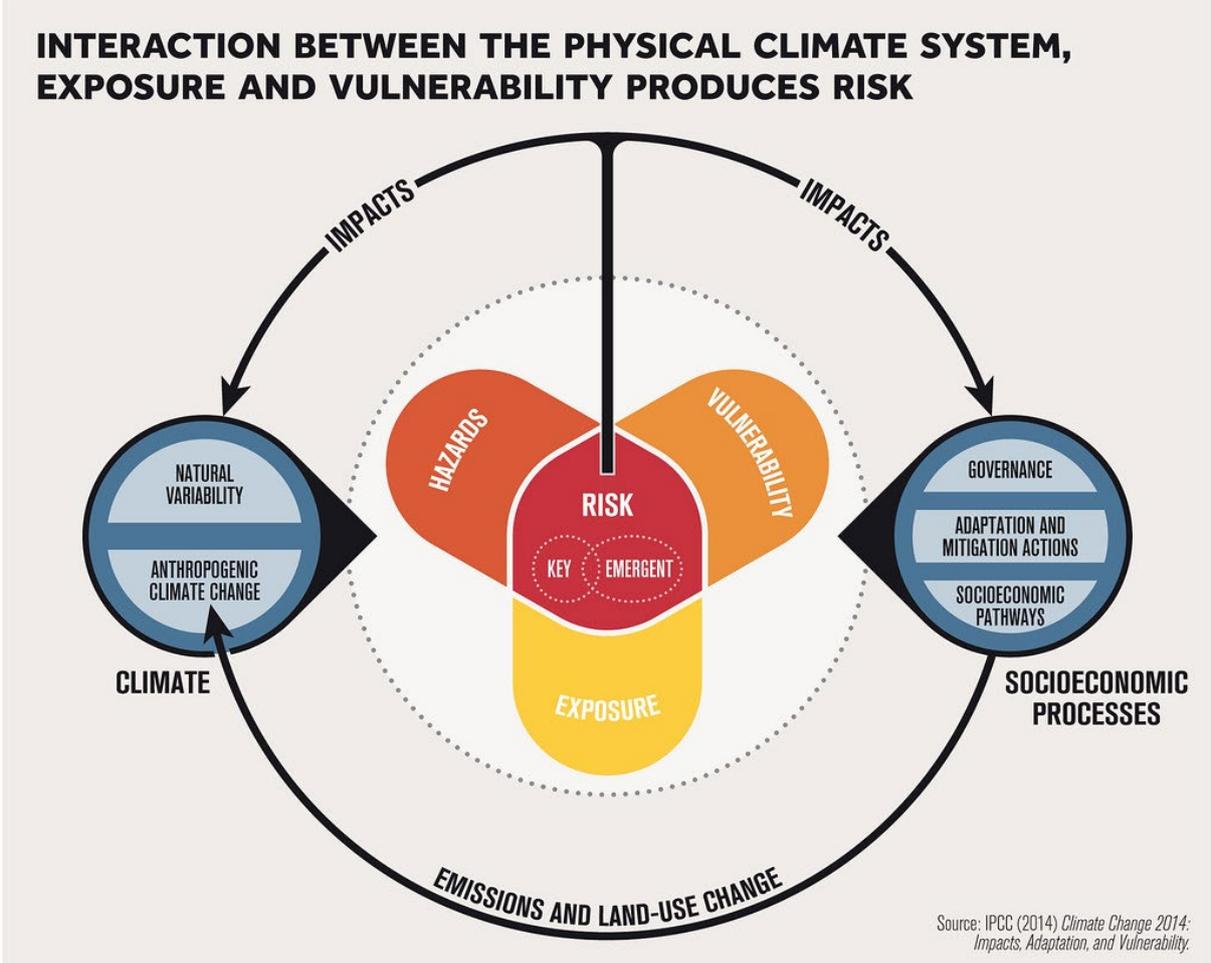
These impacts are symptomatic of rising global temperatures, with both Africa and the world projected to approach or exceed 1.5 °C above pre-industrial levels. If warming continues at its current rate, global average temperatures are likely to reach 1.5 °C between 2030 and 2052. Scientific projections further indicate that by 2030, approximately 50% of Africa’s population may be affected by severe food insecurity and scarcity, driven by climate-related and climate-induced factors such as drought, heat stress, declining agricultural productivity, and ecosystem degradation.



Areas most at risk from Climate Change in Africa  
(Source: *CC\_Southern%20Africa\_1221%20(1).pdf*)

<sup>5</sup> Cf. IPCC AR5, 2014.

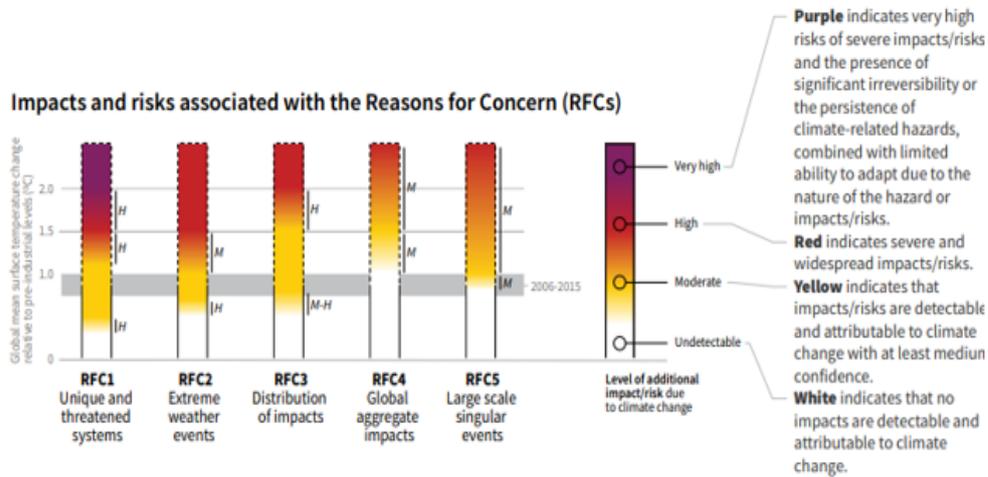
In this context, Paul Rodman, the CEO of Unilever, asserts that “the biggest risk to African growth is climate change”.



(Source: <https://www.grida.no/resources/12772> )

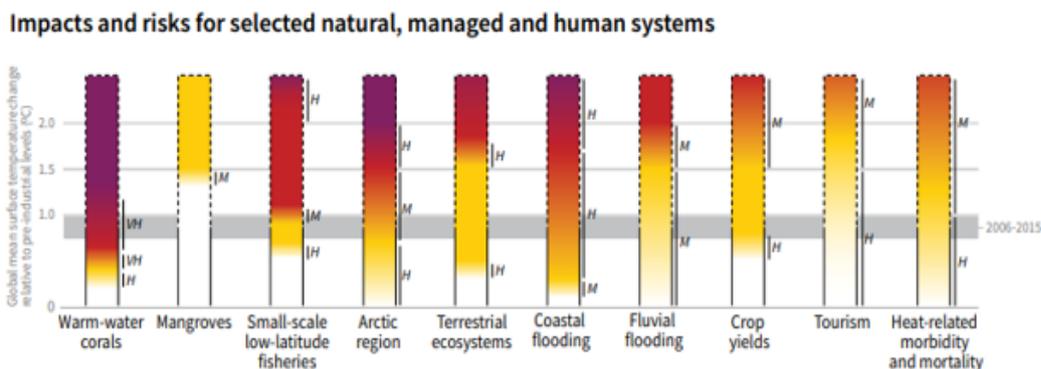
Second, the sharp rise in atmospheric CO<sub>2</sub> concentrations over the past six decades provides compelling evidence that anthropogenic factors are the primary drivers of the contemporary climate change crisis. The Intergovernmental Panel on Climate Change (IPCC) identifies five overarching Reasons for Concern (RFCs) that capture the escalating risks posed by climate change to human systems, ecosystems, and biodiversity. These RFCs synthesise scientific evidence on the severity, irreversibility, and distribution of climate impacts, as well as the risks of large-scale and potentially catastrophic outcomes.

A) Impacts and Risks Associated with the Reasons for Concern (RFCs)



(Source: <https://www.ipcc.ch/sr15/chapter/spm/>)

B) Impacts and Risks for Selected Natural, Managed Human Systems



(Source: <https://www.ipcc.ch/sr15/chapter/spm/>)

1.2.2 GREENHOUSE GASES AND TEMPERATURE RISE SCENARIOS<sup>6</sup>

First, recent scientific data published in BioScience indicate that the three principal greenhouse gases—carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O)—reached new year-to-date record atmospheric concentrations in both 2020 and 2021. In April 2021, global atmospheric carbon dioxide concentrations rose to approximately 416 parts per million (ppm), marking the highest monthly average ever recorded. Consistent with these trends, 2020 was the second-hottest year on record, and, notably, all five warmest years have occurred since 2015, underscoring the accelerating nature of anthropogenic climate change.

<sup>6</sup> Cfr. Bioscience September 2021/Vol. 71. No. 9 – <https://academic.oup.com/bioscience>.

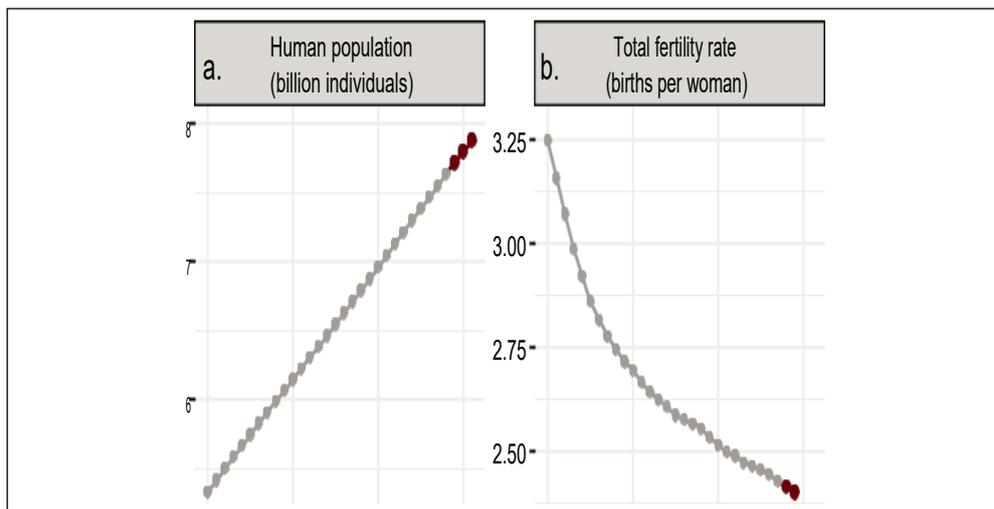
Second, recent scientific evidence demonstrates an unprecedented acceleration in the melting of glaciers and ice sheets, particularly in Antarctica, Greenland, and the Arctic. Comprehensive global analyses indicate that these cryospheric systems are now losing approximately 31% more ice per year than they did 15 years ago (Hugonnet *et al.*, 2021), reflecting a marked intensification of climate-driven ice loss.<sup>7</sup> Beyond the cryosphere, climate change impacts are evident in the world's oceans, where marine heatwaves, rising sea levels, and increased variability in ocean pH are widespread, with significant implications for marine ecosystems, coastal communities, and global climate regulation.

Undoubtedly, all of these have far-reaching, short-term, medium-term, and long-term destructive effects not only on human life but also on the lives of all living beings, on soil flora and fauna, and on the sustainability of the earth as a whole.

### 1.2.3 PREDICTIONS ON THE INCREASE IN GLOBAL TEMPERATURES

Facts and Figures (Google – Mukasa University of New Hamper or Google – 1900-2100).

First, recent scientific evidence shows a steady, significant rise in CO<sub>2</sub> and other greenhouse gases worldwide, particularly over the last 60 years. Such an increase in both cases is more anthropogenic than a natural-based phenomenon.

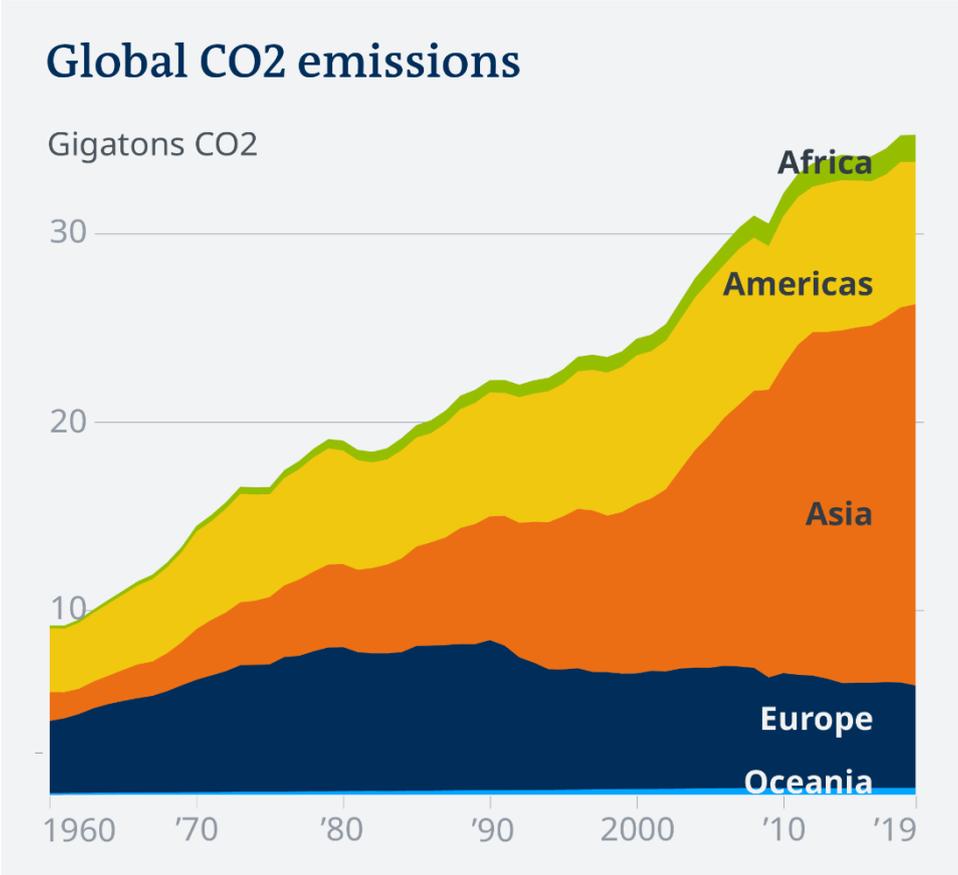


(Source: *Bioscience* September 2021/Vol. 71. No. 9)

Second, catastrophic and potentially irreversible global warming, driven in particular by the interaction between the greenhouse effect and albedo feedback mechanisms, is a real and pressing concern. As observed by Kushi Gupta (2020), climate change denial persists in some

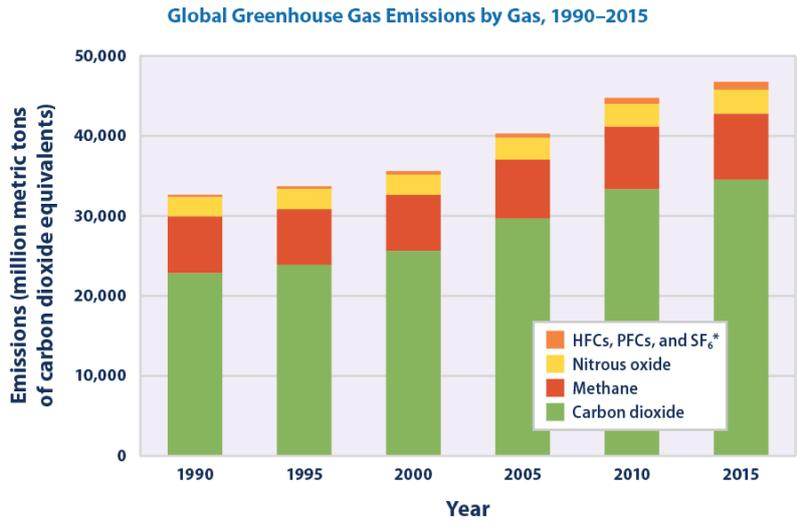
<sup>7</sup> Cfr. *Bioscience* September 2021/Vol. 71. No. 9.

quarters, with claims that global warming is “fake” often reflecting an unwillingness to confront its observable consequences, including melting glaciers, widespread impacts on animal species, and rising sea levels. Scientifically, global warming refers to the gradual increase in Earth’s average temperature resulting from the enhanced greenhouse effect, caused by elevated concentrations of greenhouse gases such as carbon dioxide and methane. Since the Industrial Revolution, human activities have been the primary driver of this process. Albedo, which measures the proportion of incoming solar radiation a surface reflects, plays a critical role in amplifying warming trends. Highly reflective surfaces, such as snow and ice, have high albedo values, whereas darker surfaces, like oceans and land, absorb more heat. As glaciers and snow cover retreat, reflective surfaces are replaced by darker ones, reducing overall albedo and increasing heat absorption. This feedback mechanism accelerates warming, contributes to further ice loss, and exacerbates sea-level rise.<sup>8</sup>

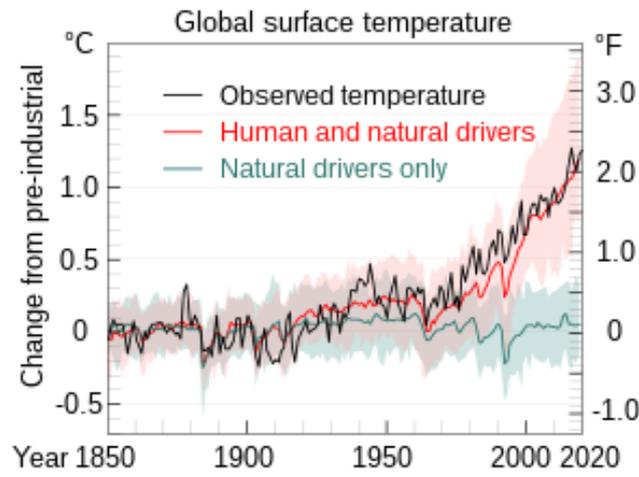


(Source: The 2021 Glasgow Climate Change Charts and Graphs on Greenhouse Effects and Albedo)

<sup>8</sup> Cfr. [www.helyx.science](http://www.helyx.science).

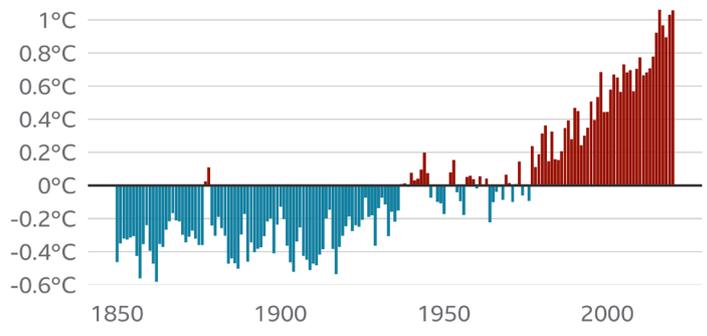


*(Source: The 2021 Glasgow Climate Change Charts and Graphs on Greenhouse Effects and Albedo)*



**The world is getting warmer**

Annual mean land and ocean temperature above or below average, 1850 to 2020



*(Source: The 2021 Glasgow Climate Change Charts and Graphs on Greenhouse Effects and Albedo)*

# CHAPTER TWO: CLIMATE JUSTICE REGIME: CRITICAL FOUNDATIONS, PRINCIPLES, AND THEIR URGENT RELEVANCE

## 2 INTRODUCTION

Climate justice connotes personal, collective, and global concerns about the equity of outcomes for people and places affected by climate change, as well as the fairness of climate responses both within and between nations. It highlights the uneven distribution of climate impacts and responsibilities, recognising that those who have contributed least to greenhouse gas emissions often bear the greatest social, economic, and environmental burdens.<sup>9</sup>

Briefly, climate justice is a relatively new, multi-disciplinary, qualitative, and multi-stakeholder ethics and value-oriented approach<sup>10</sup> that engages multiple stakeholders in responding to anthropogenic climate change-related risks, vulnerabilities, and uncertainties, at both local and global levels.

### 2.2 BASIC THEORIES FOR CLIMATE JUSTICE: THE NORMATIVE VIRTUE-BASED THEORY

According to Aristotle, ethical theory underscores the moral imperative to contribute to human flourishing (eudaimonia), understood as the good life as a whole. Within this tradition, ethical responsibility is not confined to individual conduct but extends to cultivating conditions that enable collective well-being over time. Norms, values, and ethos—particularly those that promote, guide, and sustain climate justice—do not emerge spontaneously. Rather, they must be consciously cultivated, protected, and transmitted to future generations, especially amid long-term anthropogenic environmental risks.

### 2.3 DUTY-BASED (DEONTOLOGICAL) THEORY<sup>11</sup> IN CLIMATE JUSTICE DISCOURSE

Immanuel Kant (1724-1804) argues that the fundamental principle of moral behaviour is practical rationality: doing what is morally good and avoiding what is morally evil. According

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<sup>9</sup> Cfr. Tahseen Jafry (ed) Routledge Handbook of Climate Justice, London and New York: Routledge, 2020, p. 115.

<sup>10</sup> Cfr. Aidan G. Msafiri, “Ethics for Climate Justice and Sustainability through Value-Based Approaches: A New Tanzanian Model and Paradigm Shift” in Oliver C. Ruppel *et al.* Climate Change: International Law and Global Governance (Baden, Nomos:2013), p. 661ff.

<sup>11</sup> Cfr. [www.plato.stanford.edu](http://www.plato.stanford.edu) on Kant’s Moral Philosophy.

to this Kantian ethical framework, humans, in the context of climate justice, are required to act in accordance with moral duties grounded in reason and inherent in human rational agency. Applied to climate governance, this entails respecting moral rules that constrain purely instrumental treatment of the natural world and recognising a duty to act responsibly toward the climate system as a shared condition for human dignity, autonomy, and collective survival.

#### **2.4 UTILITARIAN-BASED THEORY IN CLIMATE CHANGE DISCOURSE**

According to John Stuart Mill (1965:281), “actions that lead to people’s happiness and those that lead to suffering are wrong.”<sup>12</sup> For him, therefore, the morality (rightness or wrongness) of climate-based anthropogenic (human) actions should have consequences, aftermath, or effects (“*telos*”-Greek). He underscores the importance of reimagining the consequences of human actions for climate justice, both directly and indirectly.

#### **2.5 HUMAN-RIGHTS-BASED THEORY/APPROACH IN THE CLIMATE JUSTICE DISCOURSE**

First, it critiques the disproportionate increase in the burden of climate injustice. This burden is further aggravated by the systematic exclusion of those at the Bottom of the Pyramid (BOP) from decision-making processes. These include, among others, people of colour, caste-affected communities, and marginalised and disadvantaged groups, including the oppressed and persons with disabilities, who face significantly greater exposure to climate-related disasters and health impacts than the rest of society.

Second, eco-justice, as a new global narrative, necessarily acknowledges the ethical and existential truth that clean air, water, and living environments are basic civil and human rights. They need to be respected and protected. A racially based approach to the enjoyment of favourable climate justice conditions for all is opposed to basic civil and human rights, which endanger both the dignity, health, and life of humans and communities.

Third, the current climate justice narrative, discussion, and conversation necessarily go beyond mere conventional climate justice, scientific, and technical ramifications. It upholds two key ethical principles: equity and equality. A new climate justice worldview and model pursue ethical and human values that promote the “dignity” and survival of both “climate goods” and all living beings for thousands or millions of years to come.

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<sup>12</sup> John Stuart Mill, *Mill’s Ethical Writings* (New York:1965:297).

Fourth, the IPCC Fifth Assessment Report of 2014 outlines a systematic approach to multiple risks linked with climate injustices.

*“Risk of death, injury, ill health, or disrupted livelihoods in low-lying coastal zones and other small islands due to storm surges, coastal flooding and sea-level rise. Risk of severe ill-health and disrupted livelihoods for large urban populations due to inland flooding in some regions... Risk of mortality and morbidity during periods of extreme heat, particularly for vulnerable urban populations and those working outdoors in urban or rural areas. Risk of food insecurity and breakdown of food systems linked to warming, drought, flooding and precipitation variability and extremes, particularly for poorer populations in urban and rural settings. Risk of loss of rural livelihoods and income due to insufficient access to drinking and irrigation water and reduced agricultural productivity for farmers and pastoralists with minimal capital in semi-arid regions.”*<sup>13</sup>

Fifth, there is an inherent nexus and interdependence, particularly among climate justice, technology, and energy. The post-2015 Paris Climate Summit, which I attended, underpins the urgent process of reduction of Greenhouse and other gas emissions, particularly through energy transitions towards more climate-friendly renewable energy<sup>14</sup> sources. Briefly, national and regional energy decarbonisation strategies, policies, and interests constitute a continuous process and a rethink that address the question of human rights as a whole.

## **2.6 CLIMATE JUSTICE ARCHITECTURE AND KEY CONTOURS**

### **2.6.1 CAPABILITY AND THE CLIMATE JUSTICE NEXUS**

This underscores individual and collective responsibility, particularly in addressing climate change-related injustices effectively. Conversely, the greater the ability or capacity, the bigger the responsibility. The opposite is also true.

### **2.6.2 PERFORMANCE AND THE CLIMATE JUSTICE NEXUS**

This appeals to the idea that the climate system has intrinsic “goods,” endowments, and values that warrant respect and protection in their own right, rather than merely for their instrumental benefits to humans. Safeguarding these climatic goods is essential not only for ethical reasons

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<sup>13</sup> Cfr. Tahseen Jafry (ed) Routledge Handbook of Climate Justice (London and New York, Earthscan, 2020), pp. 14-15.

<sup>14</sup> Cfr. IPCC 2014:8,21.

but also because they play a critical role in regulating the Earth system and mitigating greenhouse gas emissions, thereby supporting ecological stability and human well-being.<sup>15</sup>

#### 2.6.3 FUNDAMENTAL LIFE NEEDS AND THE CLIMATE JUSTICE NEXUS

This perspective emphasises the inalienable rights of every human being, individually and collectively, to live a dignified life and to be supported in developing the capacity to adapt to climate change-related crises.<sup>16</sup> Crucially, these rights are inherent and unconditional: they do not depend on an individual's economic productivity, social status, capability, or performance, but flow from human dignity itself.

#### 2.6.4 DISTRIBUTIVE JUSTICE AND THE CLIMATE JUSTICE NEXUS

It focuses on ensuring fair and equitable access to climate-related endowments, goods, and financial benefits,<sup>17</sup> to substantially reduce the widening disparities between wealthier and poorer individuals and communities, both within and across societies.

#### 2.6.5 EQUAL TREATMENT<sup>18</sup> AND THE CLIMATE JUSTICE NEXUS

It underscores that all measures, steps, and actions related to climate change mitigation and adaptation are local and global.

#### 2.6.6 INTERGENERATIONAL JUSTICE<sup>19</sup> AND THE CLIMATE JUSTICE NEXUS

This fosters genuinely sustainable use and management, promotes the reduction and fair distribution of climate burdens and climate-related “debt”, and supports intergenerational equity by fairly sharing responsibilities between present and future generations over the long term.

#### 2.6.7 PARTICIPATORY JUSTICE<sup>20</sup> AND THE CLIMATE JUSTICE NEXUS

This emphasises the fair and proper involvement of people in the entire decision-making process for all climate-related and climate-dependent policies and actions at all levels, particularly at the local and global levels.

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<sup>15</sup> Christoph Stückelberger, *We All are Guests on Earth: A Global Christian Vision for Climate Justice* (Bangalore: Dharmaram Publications, 2010), pp. 30-31.

<sup>16</sup> *Ibid.*, p. 31.

<sup>17</sup> *Ibid.*, p. 31.

<sup>18</sup> *Ibid.*, p. 31.

<sup>19</sup> *Ibid.*, p. 32.

<sup>20</sup> *Ibid.*, p. 32.

#### 2.6.8 PROCEDURAL JUSTICE<sup>21</sup> AND THE CLIMATE JUSTICE NEXUS

This calls for a critical rethinking of global climate debates, particularly regarding the design, implementation, and oversight of climate finance mechanisms, incentives, taxation measures, and related policy instruments. These elements must be rigorously applied and monitored as core tenets of procedural justice to ensure transparency, accountability, participation, and fairness in climate decision-making.

#### 2.6.9 FUNCTIONAL JUSTICE<sup>22</sup> AND THE CLIMATE JUSTICE NEXUS

This necessitates a comprehensive reassessment of key practical, institutional, and managerial considerations, as well as the fair allocation and distribution of responsibilities and resources, particularly for the sustainable management of non-renewable resources at both the local and global levels.

#### 2.6.10 PUNITIVE JUSTICE<sup>23</sup> AND THE CLIMATE JUSTICE NEXUS

It underpins the ethical justification for holding actors accountable for climate-induced and climate-related injustices, including through established principles of environmental law such as the “polluter pays” principle (PPP). This principle requires that those responsible for harming the climate system, environmental goods, and natural resources bear the costs of prevention, mitigation, remediation, and compensation, both locally and globally.

#### 2.6.11 TIMELY JUSTICE<sup>24</sup> AND THE CLIMATE JUSTICE NEXUS

This approach evaluates and emphasises the timely obligation to act on early warnings and to implement prevention and mitigation measures to address multiple direct and indirect vulnerabilities to climate-related injustices, disasters, and systemic risks.

### **2.7 KEY PRINCIPLES OF CLIMATE JUSTICE**

#### 2.7.1 HUMAN RIGHTS AND DIGNITY PRINCIPLE

This entails ethical and jurisprudential imperatives,<sup>25</sup> as well as the values of equity, respect, dignity, and justice. It particularly fosters the inherent, basic, and inalienable dignity and worth of every human person, regardless of gender, origin, or social status.

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<sup>21</sup> Ibid., p. 32.

<sup>22</sup> Ibid., p. 32.

<sup>23</sup> Cfr. Ibid., p. 33.

<sup>24</sup> Ibid., p. 34.

<sup>25</sup> Cfr. [www.maryrobinsonfoundation.org](http://www.maryrobinsonfoundation.org) Climate Justice searched on the 14<sup>th</sup> March, 2024.

#### 2.7.2 RIGHT TO DEVELOPMENT PRINCIPLE

It emphasises that resource equity is a prerequisite for dignified and decent lives, particularly for the billions of poor and disadvantaged people at the Bottom of the Pyramid (BOP). It further calls for the adoption of transformative and sustainable development pathways, including innovative green technologies<sup>26</sup> and climate-resilient policies, strategies, and lifestyles that can address structural inequalities while advancing environmental sustainability.

#### 2.7.3 HOLISTIC/INTEGRAL EQUITY<sup>27</sup> PRINCIPLE

It addresses the critical and increasingly pervasive patterns of climate injustice and inequality worldwide. This requires not only equal and fair treatment in the use and distribution of resources, but also a responsible and sustainable stewardship of planetary resources across short-, medium-, and long-term horizons. In this respect, the climate justice framework reiterates and reinforces the principle of common but differentiated responsibilities (CBDR), recognising shared obligations to address climate change while accounting for differing historical contributions, capacities, and development needs.<sup>28</sup>

#### 2.7.4 PARTICIPATORY, TRANSPARENCY, AND ACCOUNTABILITY PRINCIPLE

It highlights the ethical potential and significance of person-centred, transparent, responsible, and fair decision-making processes in all matters relating to climate justice. Furthermore, it underscores the need for robust ethical competence and accountability, particularly in the formulation and implementation of climate justice policies, corporate practices, and poverty reduction strategies, at both national and international levels.

#### 2.7.5 GENDER<sup>29</sup> EQUALITY AND EQUITY PRINCIPLE

It recognises the interdependence between climate injustice and gender vulnerability, highlighting how climate impacts are unevenly distributed along gender lines. Undeniably, gender “influences access to and usage of climate-sensitive resources (including freshwater and food), risk perceptions and responses to disasters, and household climate adaptation strategies... Gendered violence, migration, and poverty... compound climate risks and increase vulnerabilities.”<sup>30</sup>

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<sup>26</sup> Cfr. Ibid., Mary Robinson Foundation: Climate Justice.

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid., Tahseen Jafry (ed) Routledge Handbook of Climate Justice p. 361.

#### 2.7.6 CLIMATE JUSTICE STEWARDSHIP EDUCATION<sup>31</sup> PRINCIPLE

It underscores the indispensable and transformative role of education in caring for and protecting the climate and its resources, and in fostering eco- and climate-friendly ways of living. Such a renewed educational vision—grounded in stewardship and climate justice—requires developing a broad culture of learning and social movement change that cuts across all levels of society. This necessarily includes individuals and families, schools and universities, civil society movements, indigenous peoples and local communities, non-governmental organisations, governments, and other public and private actors.

An education-for-stewardship model must therefore be holistic in scope, encompassing the cognitive, affective, and psychomotor dimensions of climate justice, to shape not only knowledge and awareness, but also values, attitudes, skills, and sustained transformative action.

#### 2.7.7 CLIMATE JUSTICE PARTNERSHIP AND SECURITY PRINCIPLE<sup>32</sup>

This undergirds efficient and effective national, regional, and global synergies across all categories of resources—including human, financial, environmental, climatic, technological, and diplomatic—thereby enabling coherent, coordinated approaches to advancing climate justice at multiple governance levels. This integrative logic is reflected in and reinforced by Sustainable Development Goal 17, which emphasises partnerships, cooperation, and collective action as essential conditions for achieving sustainable development and climate justice worldwide.

#### 2.7.8 CLIMATE JUSTICE FINANCE ARCHITECTURE PRINCIPLE

This emerging climate justice model advances a more inclusive climate finance framework within the United Nations Framework Convention on Climate Change (UNFCCC) architecture. It reaffirms the core principles of climate justice articulated by the Mary Robinson Foundation for Climate Justice in 2017. Among other essential elements, the model emphasises respect for and protection of human rights, the right to development, the equitable sharing of climate-related benefits and burdens, and robust standards of accountability, transparency, and meaningful public participation in climate decision-making.

Gender equity and equality are likewise central to this framework, particularly through their role in transformative education for climate stewardship and in fostering effective partnerships

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<sup>31</sup> Ibid., Mary Robinson Foundation: Climate Justice.

<sup>32</sup> Ibid.

to realise climate justice.<sup>33</sup> Taken together, these elements point to the need for a fundamental paradigm shift within the UNFCCC regime—from predominantly top-down approaches toward bottom-up, participatory, and context-sensitive governance models—accompanied by credible responsibility and leadership from developed industrialised countries, commensurate with their historical contributions to climate change and their greater capacity to act.

Among the persistent gaps—indeed, lacunae—in the realisation of climate justice, several forms of justice, denied or breached, warrant particular attention. These include the lack of accountability and clarity regarding climate finance goals, the persistent shortfall in adaptation finance, the insufficient support for development needs, and the inadequate consideration of the most vulnerable individuals and communities, who are often the least responsible for climate change yet the most severely affected by its impacts.<sup>34</sup>

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<sup>33</sup> Ibid., Mary Robinson Foundation: Climate Justice.

<sup>34</sup> Ibid., Tahseen Jafry (ed) Routledge Handbook of Climate Justice pp. 169-172 passim.

# CHAPTER THREE: A CRITICAL SYNOPSIS OF CLIMATE CHANGE IMPACTS IN AFRICA: FACTS AND EXISTENTIAL FEARS

## 3 INTRODUCTION

### 3.1 TANZANIA'S SCENARIOS

#### 3.1.1 SEVERE MULTIFACETED DROUGHTS AND THEIR IMPACTS

Prolonged and severe drought has affected many regions of Tanzania, a country that remains heavily dependent on rain-fed agriculture for domestic food consumption, income generation, and export earnings. As Ladislaus Chang'a (2021: 112) observes, "the frequency and intensity of drought is projected to increase and the production of cereal crops such as maize is projected to decline by up to 50 per cent by the end of the century (by 2100) due to the impacts of climate change." Chang'a further notes that the droughts of 2003 and 2005/2006 affected most parts of the country, resulting in severe and far-reaching impacts on both the agricultural and livestock sectors. These climate shocks had measurable macroeconomic consequences: in 2005, agricultural growth fell to 5.2%, down from 5.8% in 2004, underscoring the sector's vulnerability to climate variability and the broader development risks posed by climate change.<sup>35</sup>

#### 3.1.2 LOSS OF BIODIVERSITY/ECOSYSTEMS AND HABITATS

First, in recent years, Tanzania has experienced a rapid qualitative decline, particularly in biodiversity habitats and natural resources. Among other driving factors are rapid population growth, increasing demand for plant and animal products, and invasive alien species (IAS),<sup>36</sup> global warming, and the unsustainable agro-industry.

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<sup>35</sup> Ibid., Ladislaus Chang'a Climate Variability and its Impacts in Tanzania, p. 112.

<sup>36</sup> United Republic of Tanzania Vice President's Office State of the Environment Report 3 August, 2019 pp. 76-77.

### TFS Forest Area (in Ha) Distribution by, 2013-2017

Forests	2013	2014	2015	2016	2017
<b>Total</b>	<b>48,100,000.0</b>	<b>48,100,000.0</b>	<b>48,100,000.0</b>	<b>48,100,000.0</b>	<b>48,100,000.0</b>
Natural	28,814,258.3	28,811,252.0	28,807,497.0	28,802,853.0	28,797,926.0
Planted	189,741.7	192,748.0	196,503.0	201,147.0	206,074.0
Protected Forest	19,096,000.0	19,096,000.0	19,096,000.0	19,096,000.0	19,096,000.0
Forest Area Affected by Fire	9,872,485.0	10,255,576.7	7,884,130.1	9,667,395.5	8,349,727.7

*(Source: United Republic of Tanzania Vice President's Office: State of the Environment Report – August, 2019)*

#### 3.1.3 INCREASED DESERTIFICATION AND DEFORESTATION IMPACTS

First, a recent study by the University of Dar es Salaam's Institute of Resource Assessment indicates that between 40% and 55% of Tanzania's total land area, 85.6 million hectares, is severely degraded.<sup>37</sup> This is mainly due to the increased strain on Tanzania's natural resources from hyperexploitation.

Second, a 2018 State of the Environment report published by the Controller and Auditor General (CAG) on land degradation, forest degradation, and deforestation indicates that land degradation was increasing in approximately 54% of Local Government Authorities (LGAs).<sup>38</sup> This finding highlights the widespread and growing nature of land degradation at the local level, with significant implications for agricultural productivity, ecosystem integrity, and climate resilience.

A recent Land Degradation Neutrality Report for Tanzania (2018) shows that land degradation increased from 42% in 1980 to nearly 50% in 2012.<sup>39</sup>

Among the driving factors, agro-farming practices, unsustainable extractive industry models, wildfires, overgrazing, rapid urbanisation, outdated land laws and policies, insufficient conservation knowledge, and mismanagement of non-renewable land and forest resources remain the major causes of land degradation and desertification in Tanzania.

<sup>37</sup> Cfr. [www.reliefweb.int](http://www.reliefweb.int) searched on the 22<sup>nd</sup> March, 2024.

<sup>38</sup> The United Republic of Tanzania, Vice President's Office National Environment Policy 2021 October, 2021 p.3.

<sup>39</sup> Ibid.

#### 3.1.4 DEVASTATING HEALTH IMPACTS

Climate change scenarios in Tanzania are exerting both direct and indirect adverse impacts on human health, with increasingly severe and wide-ranging consequences. Among the most significant health outcomes warranting particular attention are the rising incidence and geographic spread of malaria in both lowland and highland settings, as well as outbreaks of meningitis, dysentery, cholera, Rift Valley fever, and schistosomiasis.<sup>40</sup> These health risks are closely linked to climate variability and change, which enhance the survival, reproduction, and transmission of climate-sensitive pathogens, disease vectors, and host species, thereby increasing population exposure and vulnerability.

#### 3.1.5 NEGATIVE IMPACTS ON FRESH WATER, AVAILABILITY, ACCESSIBILITY, RELIABILITY, AND SUSTAINABILITY

Principally, climate-induced pressures are placing Tanzania's freshwater, coastal, and marine ecosystems, biodiversity, and wetlands under increasing quantitative and qualitative stress at both national and regional levels. Among the most visible indicators of this trend is the documented decline in water levels across several major lakes. In particular, Lake Victoria, Lake Eyasi, Lake Rukwa, and Lake Babati have experienced annual water-level declines of 0.6-5.0%.<sup>41</sup>

These declines are driven primarily by unsustainable, cumulative pressures on East Africa's ecosystems, including over-extraction of groundwater, degradation of river systems, and glacier retreat. These stresses are further exacerbated by recurring severe droughts, increased evaporation linked to rising temperatures, and land-use changes such as deforestation, desertification, and biodiversity loss, which collectively undermine hydrological stability and long-term water security.

#### 3.1.6 NEGATIVE IMPACTS ON HYDRO-ELECTRIC POWER PRODUCTION

Tanzania's current and projected energy mix remains heavily dependent on hydroelectric power, which accounted for approximately half of national electricity generation as of 2022, despite the country's substantial natural gas potential, particularly in Mtwara and Lindi. However, prolonged and recurrent dry spells have increasingly undermined the reliability of hydropower. For several years, key water sources feeding major hydropower facilities—including the Mtera Hydroelectric Power Dam, Nyumba ya Mungu Hydroelectric Power Dam,

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<sup>40</sup> United Republic of Tanzania 2011, National Climate Change Strategy and Action Plan, Dar-es-Salaam, Vice President's Office Division of Environment, URT pp. 16-20 passim.

<sup>41</sup> Cfr. Ibid., United Republic of Tanzania, 2011, p. 16.

and the Pangani Hydroelectric Power Dam—have experienced persistently reduced inflows, highlighting the vulnerability of Tanzania’s energy security to climate variability.

### 3.1.7 OTHER MULTIPLE DESTRUCTIVE IMPACTS AND VULNERABILITIES

First, gender-linked vulnerabilities encompass a wide range of direct and indirect climate-induced impacts and disasters, which disproportionately affect women, girls, and gender-diverse or marginalised groups. As the well-known axiom holds, “there is no climate justice without gender justice.” This reflects the reality that “women’s roles and responsibilities are often closely tied to caregiving duties,” with women’s position as primary caretakers “lying at the centre of their vulnerability to the impacts of climate change.”<sup>42</sup> These structurally embedded roles and inequalities often lead to greater exposure to climate risks, limited adaptive capacity, and restricted access to resources and decision-making processes. Consequently, climate change often reinforces existing gender inequalities, giving rise to the feminisation of poverty, particularly in contexts characterised by economic precarity, resource scarcity, and weak social protection systems.

Second, climate change-related hazards—whether local or global—are fundamentally gendered in their causes, impacts, and outcomes. As Patricia E. Perkins (2020: 349) affirms, in many countries, particularly in the Global South, “women on average tend to be less educated, poorer, less mobile and more long lived than men—all risk factors for vulnerability to climate change.” She further observes that in many contexts, “agricultural and food production, cooking, care for children and other family and community members, and obtaining water for households are almost exclusively women’s responsibilities.”<sup>43</sup> These gendered divisions of labour and structural inequalities significantly increase women’s exposure to climate-related risks while simultaneously constraining their adaptive capacity. As a result, climate hazards often exacerbate existing social and economic inequalities, reinforcing gender-differentiated vulnerability and deepening climate injustice.

Third, from a management and leadership perspective, both the causes and the perceived “benefits” or “advantages” of climate change are deeply gendered. Contemporary socio-economic models of leadership and governance remain predominantly masculinised, particularly in terms of representation, agenda-setting, and decision-making authority. As a result, “policy makers are mostly men, and insights drawn from women’s lived experiences of

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<sup>42</sup> Ibid., Tahseen Jafry (ed), Routledge Handbook of Climate Justice, p. 367.

<sup>43</sup> Patricia E. Perkins “Climate Justice, Gender and Intersectionality” in Tahseen Jafry (ed) Routledge Handbook of Climate Justice pp. 349-350.

climate change remain under-represented; at the level of theory, feminist ethical and ontological frameworks and methodologies are often marginalised or ignored within policy circles.”<sup>44</sup> This gender imbalance not only limits the diversity and quality of climate governance but also shapes policy priorities and outcomes in ways that can reinforce existing inequalities. The exclusion of feminist and gender-responsive perspectives constrains the development of inclusive, equitable, and context-sensitive climate responses, thereby perpetuating structural dimensions of climate injustice.

Lastly, a range of severe environmental and political hazards continues to generate devastating impacts, with flooding emerging as a particularly acute risk in Tanzania over the past decade. As Ladislaus Chang’a (2021: 115) observes, “on average, floods account for approximately 22 per cent of the people directly and indirectly affected by disasters and 66 per cent of households destroyed between 1972 and 2020. Floods also account for 16 per cent of disaster-related deaths.”<sup>45</sup> More broadly, recurrent droughts (associated with La Niña conditions) and floods (associated with El Niño events) are among the most significant climate-related disasters affecting Tanzania. The increasing frequency and intensity of these events reflect escalating weather extremes driven by anthropogenic climate change, which compound existing vulnerabilities and place growing pressure on livelihoods, infrastructure, and governance systems.

### **3.2 SUB-SAHARAN AFRICA’S SCENARIOS**

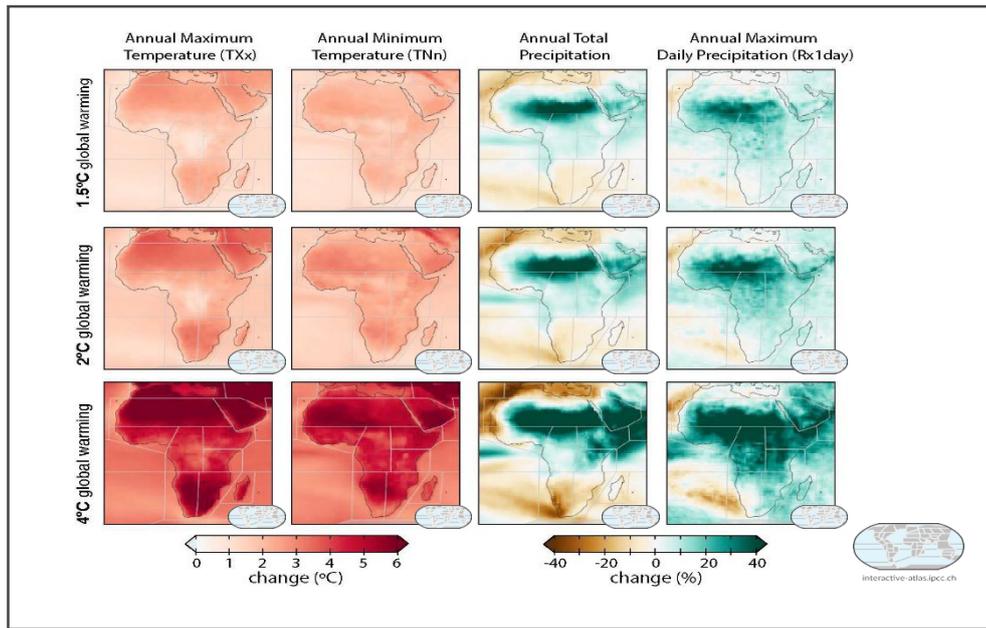
#### **3.2.1 ACUTE TEMPERATURE VARIABILITIES AND TRENDS**

According to the Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Africa is currently experiencing rising mean temperatures, extreme heat, unprecedentedly frequent marine waves, and rising relative sea level.

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<sup>44</sup> Ibid., Patricia E. Perkins, pp. 350-351.

<sup>45</sup> Ibid., Ladislaus Chang’a p. 115.



(Source: [interactive-atlas.ipcc.ch](http://interactive-atlas.ipcc.ch)) – Results expanded in the Interactive Atlas (active links)

With further increases in global warming, changes in hot and cold temperature extremes mean that the maximum one-day precipitation amount increases.

Projected changes in annual maximum temperature (TXx), annual minimum temperature (TNn), annual mean precipitation and annual maximum daily precipitation (RX1day) at 1.5 °C, 2 °C, and 4 °C of global warming (in rows) compared to 1851-1900. Results are based on simulations from the CMIP6 multi-model ensemble mean.

### 3.2.2 AFRICA’S PRECIPITATION UNCERTAINTIES AND VULNERABILITY/SCENARIOS

First, as far as Africa’s precipitation landscape is concerned, Niang and Ruppel et al. indicate that over the “last few decades, the northern regions of North Africa (North of the Atlas Mountains and along the Mediterranean Coast of Algeria and Tunisia) have experienced a strong decrease in the amount of precipitation received in winter and early spring... The observed record also indicates greater than 330 dry days (with less than 1mm day<sup>-1</sup>) per year over the 1997-2008 time period...”<sup>46</sup>

Second, scientific scenario analysis and evidence show that rainfall “over the Sahel has experienced an overall reduction over the course of the 20<sup>th</sup> century...”<sup>47</sup>

<sup>46</sup> Niang I, O.C. Ruppel, M.A. Abdrabo, A. Essel, C. Lennard, J. Padgham, and P. Urquhart, 2014: Africa. In: Climate Change 2014: Impacts, Adaptation and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, p. 1209.

<sup>47</sup> Ibid., Niang I, O.C. Ruppel *et al.* p. 1209.

Third, in Eastern Africa, scientific evidence indicates that “over the last 3 decades rainfall decreased... between March and May/June... Monsoonal precipitation has declined throughout much of the last 60 years... as a result of the changing Sea Level Pressure (SLP) gradient between Sudan and the Mediterranean Sea and the Southern tropical Indian Ocean region.”<sup>48</sup>

Last, but not least, in Southern Africa, a significant “reduction in late austral summer precipitation has been reported over its western parts extending from Namibia, through Angola and towards Congo... The drying is associated with an upward trend in tropical Indian Ocean Sea surface temperatures (SSTs)...”<sup>49</sup>

### 3.2.3 EXPECTED VULNERABILITIES AND IMPACTS ON RESOURCES AND ECOSYSTEMS

#### (a) On Water Resource

First, several studies on the African continent allude “to a future decrease in water abundance due to a range of drivers and stresses, including climate change in Southern and Northern Africa... Reduced snowpack in the Atlas Mountains is expected to reduce suppliers of seasonal meltwater for lowland areas of Morocco.”<sup>50</sup>

Second, in Eastern Africa, ever-decreasing “flows in the Blue Nile are estimated by the late century due to a combination of climate change (high temperatures and declining precipitation)”.<sup>51</sup>

Third, recent African climate studies and projections indicate that water resources in many parts of the continent will decline substantially due to climate-related factors. It has also been claimed that groundwater “recharge may also be significantly affected by climate change in areas that receive 500mm per year... By contrast, areas receiving between 200mm and 500mm per year, including the Sahel, the Horn of Africa and Southern Africa, may experience a decline in groundwater recharge with climate change to the extent that prolonged drought and other precipitation anomalies become more frequent with climate change, particularly in shallow aquifers...”<sup>52</sup> There is a clear nexus, particularly between climate change and increased risks to water resources in Africa. Among African nations, Egypt is the best example of a country facing significant vulnerabilities and risks. Thus, it exacerbates the ever-widening gap between water availability and sustainability.

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<sup>48</sup> Ibid., p. 1209.

<sup>49</sup> Ibid., p. 1209.

<sup>50</sup> Ibid., p. 1217.

<sup>51</sup> Ibid., p. 1217.

<sup>52</sup> Ibid., pp. 1217-1218.

(b) Vulnerability/Impacts to Africa's Agricultural Sector and Food Security

First, it is true that “Africa’s food production systems are among the world’s most vulnerable because of extensive reliance on rainfed crop production, high intra-and inter-seasonal climate variability, recurrent droughts and floods that affect both crops and livestock, persistent poverty that limits the capacity to adapt...”<sup>53</sup>

Second, Africa’s agro-industry for food and cash crops’ sector is too small to experience “an overall negative effect on yields... Estimated yield losses at mid-century range from 18% in Southern Africa to 22% across Sub-Saharan Africa, with losses for South Africa and Zimbabwe... Simulations that combine all regions South of the Sahara suggest consistently negative effects of climate change on major cereal crops in Africa, ranging for 2% for sorghum to 35% for wheat by 2050...”<sup>54</sup> It goes without saying that all these threaten both the quantity and the availability of food security in Africa across short-, medium-, and long-term scenarios.

(c) Vulnerability to Livestock and Fishery Sectors

First, among other major stressors, include “range land degradation, increased variability in access to water, fragmentation of grazing areas, decentralisation. Changes in land tenure from communal to private ownership; migration of non-pastoralists into grazing areas; and a lack of opportunities for diverse livelihoods. Loss of livestock under prolonged drought conditions is a critical risk given the extensive rangeland in Africa that is prone to drought...”<sup>55</sup>

Second, in an “analysis of fisheries in 132 countries”, Allison *et al.* estimated that two-thirds of the most vulnerable countries were in Africa. Among these countries, the most vulnerable were Angola, the Democratic Republic of the Congo, Mauritania, and Senegal, due to the importance of fisheries to low-income populations and the close link between climate variability and fisheries production. Coastal countries in West Africa will experience significant negative impacts from climate change. Lam *et al.* (2012) projected that by 2050, “the annual landed value of fish for that region is estimated to decline by 21%, resulting in a nearly 50% decline in fisheries-related employment and a total annual loss of USD 311 million to the region’s economy”.<sup>56</sup>

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<sup>53</sup> Ibid., p. 1218.

<sup>54</sup> Ibid., p. 1218.

<sup>55</sup> Ibid., p. 1220.

<sup>56</sup> Ibid., pp. 1220-1221.

(d) Vulnerability to Human Health

First, climate change variability is increasingly a cause and an effect of multiple vector-borne diseases and other climate-sensitive health outcomes in Africa. Among others, these include highland malaria, Leishmaniasis, Rift Valley Fever, Aedes-borne viruses, ticks and tick-borne diseases, schistosomiasis, diarrhoea, and meningococcal meningitis.<sup>57</sup> Furthermore, high “ambient temperatures are associated with increased mortality in Ghana, Burkina Faso and Nairobi, with associations varying by age, gender... Climate change is anticipated to affect the sources of air pollutants...”<sup>58</sup>

(e) Disaster Vulnerabilities and Risk Management Scenarios

First, recent research finds that Southern Africa is among the most affected regions, particularly in the severity and magnitude of extreme climate disasters.<sup>59</sup>

<b>Event</b>	<b>Period</b>	<b>Countries Affected</b>	<b>Effects</b>	<b>Monetary loss</b>
Knysha Fires	June 2017	South Africa	Mega-fire caused five human deaths and the destruction of 1,000 homes	\$25 million worth of loss in buildings and infrastructure
Cyclone Idai	March 2019	Mozambique, Malawi, and Zimbabwe	Flash flooding caused approximately 900 human deaths, destruction of infrastructure and crops. 100,000 homes damaged/destroyed	\$773 million worth of loss in buildings, infrastructure, and crops
Cyclone Kenneth	April 2019	Malawi, Mozambique, and Zimbabwe	3 million people affected by the combined effects of Cyclones Idai and Kenneth	\$100 million worth of loss of homes, crops, and infrastructure
Torrential rains	December 2019 - January 2020	Botswana, Mozambique, South Africa, Zambia, and Zimbabwe	Damage to infrastructure, human injuries, loss of lives, and displacement of people	
Pest infestations	March-April 2020	Malawi, Mozambique, and Zambia	Crop destruction; reduced production	

<sup>57</sup> Ibid., pp. 1222-1224.

<sup>58</sup> Ibid., p. 1224.

<sup>59</sup> Cfr. SADC & GIDRM/GIZ, 2020.

*(Source: Major climate-related event 2019/2020, and 2017. Source: SADC & GIDRM/GIZ, 2020)*

Second, from an East African perspective, Chang'a (2021:115) comments that the “combined influence of El Niño and positive phase of IOD was associated with significant rainfall, causing severe and devastating floods over most of East Africa. The severe floods caused loss of life and properties and severe destruction of transport and other socioeconomic infrastructures, including destruction of houses, roads and bridges, and thus paralysing transport and movement of people across much of Tanzania...”<sup>60</sup>

Admittedly, severe droughts and unprecedented floods in East Africa, as well as in other parts of Africa, are mainly a result of climate variability. These pose significant management, infrastructure, financial, and planning challenges for many cities, communities, and countries across Africa.

### **3.3 GLOBAL SCENARIOS**

#### **3.3.1 THE EFFECTS OF THE ANTHROPOCENE**

First, the Intergovernmental Panel on Climate Change (IPCC 2018: 6) estimates that human activities have already caused approximately 1.0 °C of global warming above pre-industrial levels, with a likely range of 0.8 °C to 1.2 °C. If current trends continue, global warming is expected to reach 1.5 °C between 2030 and 2052.<sup>61</sup>

Second, catastrophic anthropogenic emissions from “the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts...”<sup>62</sup>

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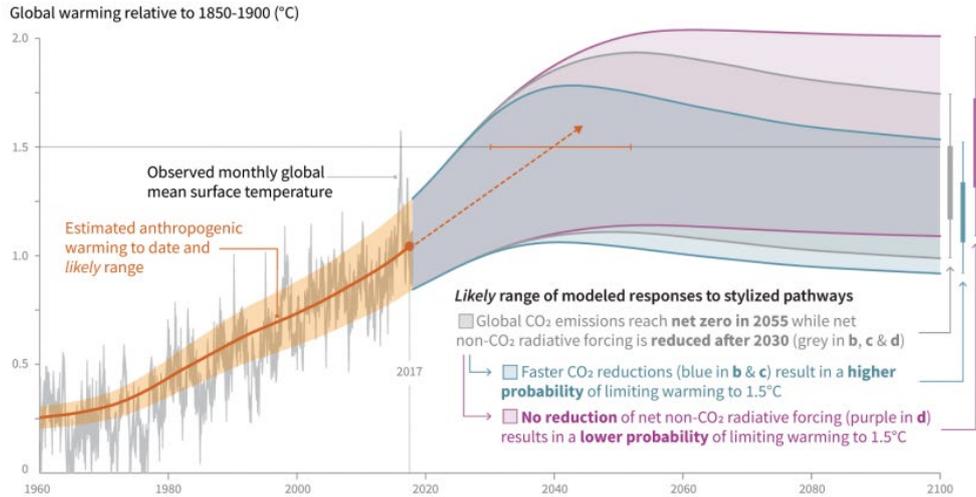
<sup>60</sup>Ibid., Chang'a 2021 p. 115.

<sup>61</sup> Cfr. IPCC, 2018 p. 6.

<sup>62</sup> Cfr. IPCC, 2018 p. 7.

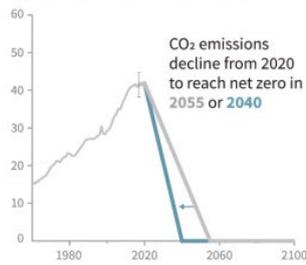
## Cumulative emissions of CO<sub>2</sub> and future non-CO<sub>2</sub> radiative forcing determine the probability of limiting warming to 1.5°C

### a) Observed global temperature change and modeled responses to stylized anthropogenic emission and forcing pathways



### b) Stylized net global CO<sub>2</sub> emission pathways

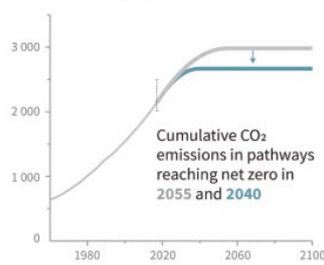
Billion tonnes CO<sub>2</sub> per year (GtCO<sub>2</sub>/yr)



Faster immediate CO<sub>2</sub> emission reductions limit cumulative CO<sub>2</sub> emissions shown in panel (c).

### c) Cumulative net CO<sub>2</sub> emissions

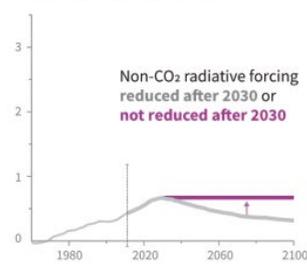
Billion tonnes CO<sub>2</sub> (GtCO<sub>2</sub>)



Maximum temperature rise is determined by cumulative net CO<sub>2</sub> emissions and net non-CO<sub>2</sub> radiative forcing due to methane, nitrous oxide, aerosols and other anthropogenic forcing agents.

### d) Non-CO<sub>2</sub> radiative forcing pathways

Watts per square metre (W/m<sup>2</sup>)



(Source: <https://www.ipcc.ch/sr15/chapter/spm/>)

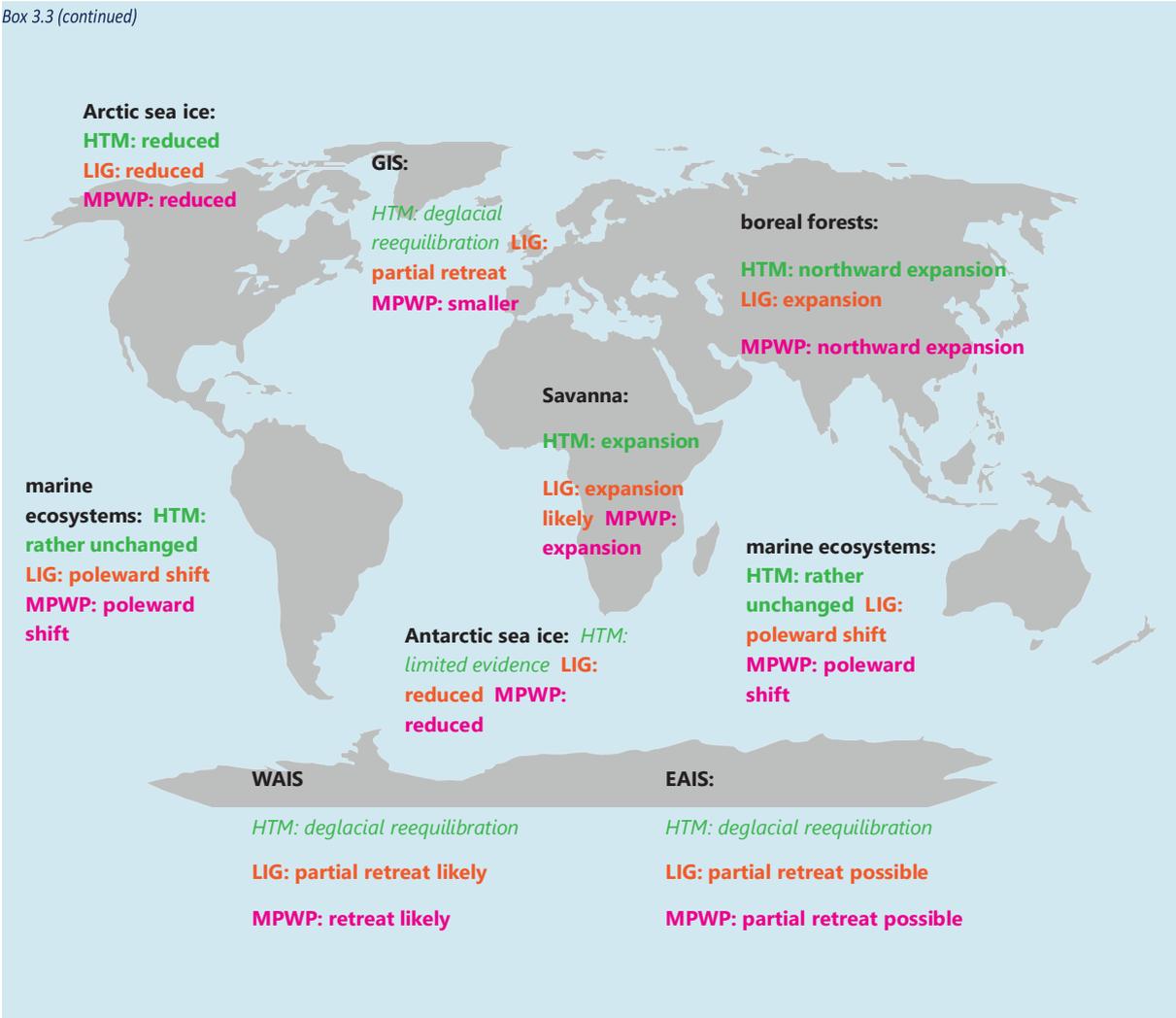
### 3.3.2 OBSERVED AND PROJECTED CLIMATE CHANGE POTENTIAL IMPACTS AND INTERRELATED RISKS

First, human-induced (Anthropocene) climate change and weather variabilities greatly affect global ecosystems, biodiversity, and human society. These pose irreversible, insurmountable risks and vulnerabilities to ecosystem degradation, biodiversity loss, species extinctions, and the demolition of human settlements and key infrastructure.<sup>63</sup>

<sup>63</sup> Cfr. Ibid., IPCC, Global Warming of 1.5 pp. 10-11.

# Impacts of 1.5 °C of Global Warming on Natural and Human Systems

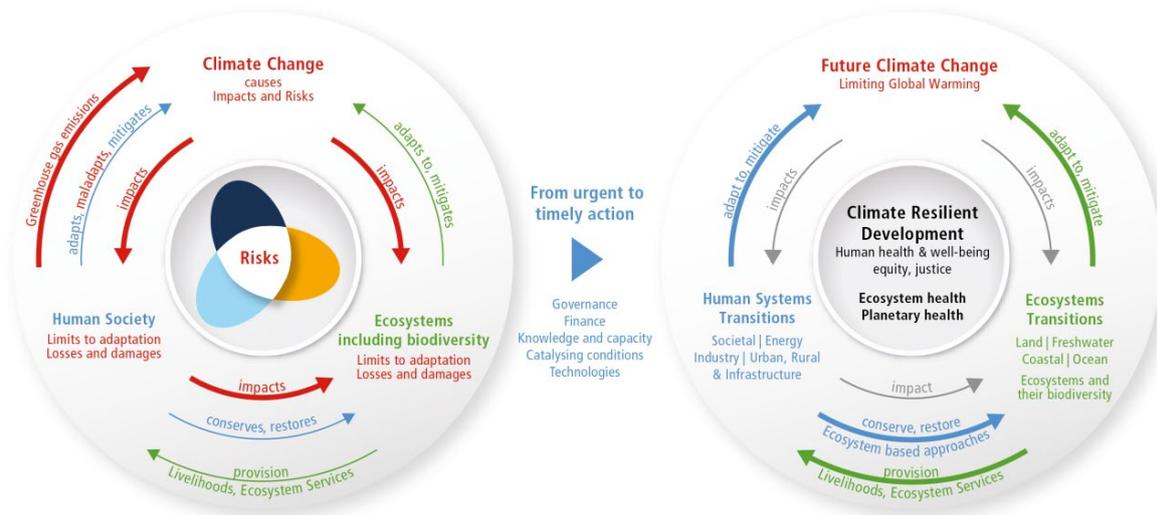
Box 3.3 (continued)



(Source: <https://www.ipcc.ch/sr15/>)

Second, climate change, global variabilities, and weather extremes beyond 1.5 °C to 2.0 °C constitute massive risks to health, food security, livelihoods, water availability and supply, peace, human security, and sustainable human growth<sup>64</sup> as encapsulated in the 2030 Sustainable Development Goals (SDGs 17). Human populations, particularly those of small islands, coastal communities’ indigenous people, and the least developed states globally, are at risk of multiple stresses and destruction. It has been affirmed that, beyond 2040, extreme climate events will pose multiple risks and crises, particularly to natural and human systems. These include short- to near-term risks (2021-2040), medium-term risks (2041-2060), and long-term risks (2081-2100).

<sup>64</sup> Cfr. Ibid., IPCC, 2018 p. 11.



(Source: <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>)

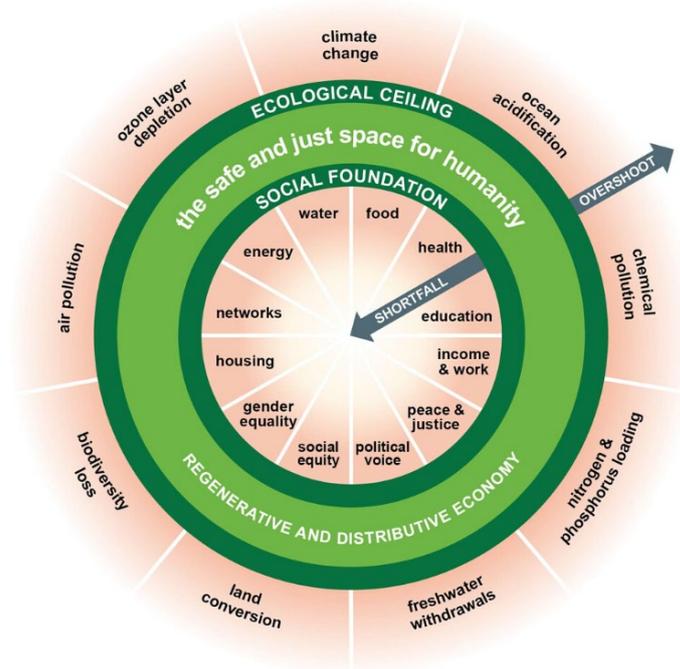
Admittedly, “see level rise will continue beyond 2100... Marine ice sheet instability in Antarctica and/or irreversible melting of the Greenland ice sheet could result in multi-meter rise in sea level over hundreds and thousands of years...”<sup>65</sup> Among other things, these tragic scenarios are critical to the survival of both humans and non-humans, as they multiply the lenses through which cascading and interlinked global socio-economic, infrastructural, human, environmental, and technological challenges must be understood as a whole.

### 3.4 CLIMATE CHANGE VULNERABILITIES AND RETHINKING THE DOUGHNUT ECONOMIC MODEL/THEORY

First, according to its creator, Kate Raworth (2012), the central and highly relevant concern is achieving balance and stability, grounded in fairness, justice, and equity, both locally and globally, within the limits of available resources. It shuns two dangerous extremes.

<sup>65</sup> Cfr. IPCC, 2018 p. 9.

## A DIGRAM OF THE DOUGHNUT ECONOMY



(Source: <https://renenergy.co.uk/insight/what-is-the-doughnut-economy-and-how-does-it-apply-to-climate-change/>)

Second, any human overshoot of available global renewable and non-renewable resources entails risks and vulnerabilities, including extreme climate events, ocean acidification, air and chemical pollution, ozone (O<sub>3</sub>) depletion, biodiversity loss, and land degradation.<sup>66</sup>

Third, among others, due to an increase in resource overshoot and overuse by billions of people worldwide, “*Eleven per cent of the population is undernourished... Twenty nine percent of people live on less than \$3.10 a day... A further 13% of young people are seeking but unable to find work... Finally, 9% of the population have no access to improved drinking water and 32% lack improved sanitation.*”<sup>67</sup>

<sup>66</sup> Cfr. <https://renenergy.co.uk/insight/what-is-the-doughnut-economy-and-how-does-it-apply-to-climate-change/> searched on the 3<sup>rd</sup> May, 2024.

<sup>67</sup>Ibid.

# CHAPTER FOUR: UNPACKING THE CLIMATE JUSTICE REGIME NARRATIVE TODAY

## 4 INTRODUCTION

### 4.1 DEFINITION/MEANING

#### 4.1.1 CLIMATE JUSTICE

Climate justice refers to a relatively new concept that “addresses the just division, fair sharing, and equitable distribution of the benefits and burdens of climate change and responsibilities...”

Conversely, other nations view climate justice as the need to curb climate change within a certain range, such as the Paris Agreement target of 1.5 °C. Briefly, climate justice is a central tenet of SDG 13.

#### 4.1.2 RATIONALE/JUSTIFICATION

Climate change vulnerability and risks affect individuals and nations differently, regardless of their preparedness, response, and recovery capabilities. Consequently, climate justice insists on collective individual and collective rights and chances, particularly for future generations, in sharing both the burdens and the benefits of climate change and securing authentic essential needs for food, housing, and energy use<sup>68</sup> and a healthy environment.

### 4.2 FOUNDATIONAL PILLARS AND<sup>69</sup> PRINCIPLES OF CLIMATE JUSTICE

#### 4.2.1 HUMAN RIGHTS AND RESPECT PILLAR

Among others, this entails an ensemble of interconnected and interdependent rights. These are mostly directly or indirectly susceptible to multiple climate change risks and vulnerabilities. They encompass:

- a) The right to a respectful and human dignified life at any place.
- b) The right to personal autonomy and preference.
- c) The right to integrate and sustain socio-economic, cultural, and political growth (progress).

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<sup>68</sup> Tahseen Jafry (ed) Routledge Handbook of Climate Justice p. 115.

<sup>69</sup> Cfr. [www.ohchr.org](http://www.ohchr.org) searched on the 12<sup>th</sup> May, 2024.

- d) The right to proper, healthy/nutritional, and sufficient food, particularly to the poorest of the poor and the marginalised.
- e) The right to the highest obtainable quality of physical and mental health.
- f) The right to sufficient, safe, and affordable water and sanitation.
- g) The right to sufficient and decent housing.
- h) The right to free compulsory primary education for everyone.
- i) The right to be relevant and actively participate.
- j) The rights of the most vulnerable and poorest of the poor to climate vulnerabilities.
- k) The intergenerational rights for thousands and thousands of years to come, both animals (*soil fauna*) and plants (*soil flora*).
- l) The right to share climate benefits and burdens<sup>70</sup> equitably.
- m) The right for restoration, reparation,<sup>71</sup> and compensation.
- n) The right to punishment<sup>72</sup> or penal action.
- o) The right to on-time justice.<sup>73</sup>

### 4.3 ETHICAL PRINCIPLES AND BENCHMARKS

#### 4.3.1 THE PRINCIPLE OF CARE AND COMPASSION

It reminds us all to proactively and conscientiously avoid insensitivity and indifference to climate change vulnerabilities. Hence, underscoring the ethical values of moderation and empathy toward all climate goods.

#### 4.3.2 THE DEEP CHANGE AND MIDDLE PATH ETHICAL PRINCIPLE

It emphasises the qualitative dimensions of change, in contrast to arithmetic and geometric trajectories, particularly in relation to climate and sustainability challenges. In this regard, Jeffrey Sachs (2001:162) strongly observes that the “essential teaching of Buddha and Aristotle is the path of moderation pursued through life-long diligence, training and reflection. It is easy to be addicted to hyper consumerism, the search for sensory pleasures, and the indulgence of self-interest, leading to a brief but long-term unhappiness.”<sup>74</sup>

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<sup>70</sup> Cfr. Christopher Stueckelberger, “We All are Guests on Earth”, Bangalore, Dharmaran Publications, 2010, p. 34.

<sup>71</sup> Ibid., p. 31.

<sup>72</sup> Ibid.

<sup>73</sup> Ibid., p. 74.

<sup>74</sup> Cfr. Jeffrey Sachs, *The Price of Civilisation: Economics and Ethics After the Fall*. London, The Bodley Head, 2011, p. 162.

#### 4.3.3 THE PRINCIPLE OF COMMON GOOD/WELFARE

It emphasises a broad-spectrum, holistic approach to every individual's well-being, particularly by promoting a new Avantgarde of socio-economic, climate, and technological solidarity, inclusivity, reciprocity, and sustainability. Briefly stated, it shuns the "I- syndrome or Culture" and spearheads the "We culture and Vision".

#### 4.3.4 THE PRINCIPLE OF GLOBALISATION OF CONCERN

According to Aidan G. Msafiri (2013:670), this encapsulates a subtly "new ethos and value-based commitment to climate and sustainability... It emphasises the values of human responsibility with and for nature... in the collective call or quest to globalise values, virtues and ethos for human life and the planet by using a profound, proactive and preventive approach."<sup>75</sup> It underlines the axiom that "when good people do nothing, evil increases".

#### 4.3.5 THE PRINCIPLE OF FAIRNESS AND EQUITY

It emphasises equal treatment in the use and distribution of climate and planetary goods and resources, and their sustainable management for present and future generations.<sup>76</sup> It must be noted that equity does not mean equality.

#### 4.3.6 THE EFFICIENCY AND THE CRADLE-TO-CRADLE PRINCIPLE

First, according to Ernst Ulrich von Weizsäcker and others,<sup>77</sup> true efficiency must necessarily begin with a credible revolution in efficiency. It must incorporate the following fundamental elements: a better life, reduced pollution, ethical profit, integral justice, resource-reuse management systems, the creation of decent jobs and job opportunities, and international security. Second, the Cradle-to-Cradle, an innovative climate change and sustainability model by Michael Braungart and William McDonough (2009), highlights a critical quest to radically remake the way humanity makes things. It entails, among others, a reassessment of design, eco-effectiveness, the idea being that less bad is bad, respect for global diversity and placing eco-effectiveness<sup>78</sup> into real day-to-day life locally and globally.

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<sup>75</sup> Cfr. Oliver C. Ruppel, Christian Roschman, Katharina Ruppel – Schlichting, *Climate Change: International Law and Global Governance* Vol. II, Baden-Baden, Nomos, 2013, p. 676.

<sup>76</sup> Cfr. *Ibid.*, p. 676.

<sup>77</sup> Ernst Ulrich von Weizsäcker, Amory Lovins & L. Hunter Lovins, *Faktor Vier: Doppelter Wohlstand-Halbierter Naturverbrauch*, Munich, Droemer Knauer 1995, pp. 21–23.

<sup>78</sup> Michael Braungart, William McDonough, *Cradle to Cradle: Remaking the Way We Make Things*, London, Vintage Books 2009, pp. 3-187 *passim*.

#### 4.3.7 THE “GOLDEN RULE PRINCIPLE” AND THE RIGHT TO FOOD AND WATER

First, the “Golden Rule Principle” is common to all great religions and traditions, including Judaism, Christianity, Islam, and Buddhism. It epitomises the highest form of love (Agape), vertically towards the creator and horizontally, a broad-spectrum view/vision towards fellow humans, the created world, and planetary goods, including climate. Patricia Mische (2000:594) succinctly summarises this principle by reaffirming that “one’s neighbour also includes respecting their need for and rights to water, food, shelter and adequate resources. By further extension, one can see that loving one’s neighbour includes respect for the rights and needs of future generations. Those yet to come depend on our proper stewardship resources on a finite planet...”<sup>79</sup> The right to food, shelter, and water (Mt. 25:34-36) is therefore a key existential prerequisite for fostering freedom from fear, want, and need.

#### 4.3.8 THE PRINCIPLE OF “WE ALL ARE GUESTS ON EARTH”<sup>80</sup>

According to Christopher Stückelberger (2010:4-40), this principle underpins the global vision and ethos for climate justice. It encapsulates the anthropocentric relationship between humans and the climate and environment, grounded in stewardship, care, governance, protection, trust, and diligent service for and with climate and planetary goods. Pope Francis’s “*Laudato Si*” Encyclical reiterates the vision of “Our Earth” as “Our Home” in a very salient and transformative manner.

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<sup>79</sup> Patricia Mische, Integrity of Creation in: Hessel, Dieler & Rosemary Ruether (eds) Christianity and Ecology, Cambridge, MA, Harvard University Press, 2000 p. 594.

<sup>80</sup> Christopher Stückelberger, We All are Guests on Earth, pp. 4-40.



compared with men and boys. From a health perspective, the physical, mental, and reproductive health of women and girls is more susceptible to multiple health risks and impacts.

The intersectionality and cross-sectionality between climate justice and gender are critical. It needs urgent reassessment. In the rural global South, for instance, women generally lack information about floods, climate change, adaptation, mitigation, finance, and policies. Briefly, this principle and view call for a radical rethink on the interconnectedness, particularly between gender and multiple climate injustices and vulnerabilities, particularly in the African “*Sitz in Leben*”.

#### 4.6 CLIMATE JUSTICE AND INNOVATION PRINCIPLE

This principle underlines the relevance and urgency of an equitable<sup>82</sup> and inclusive energy transition and technological innovation. It calls for reframing the current, inefficient, unsustainable, non-resilient, and non-inclusive energy and techno-developmental “next gen” models toward climate justice and breakthroughs in friendly, innovative, technological, and developmental areas. Hence, shunning away from all forms of non-smart and non-inclusive “solutions”, particularly in Africa. Germany’s recent “*Energiewende*” paradigm is one of the best models, especially in the critical post-2022 Russian-Ukrainian War and Climate Emergency World Scenario. Briefly, the four big “I’s” Innovation, Inclusivity, Investment, and Infrastructure should inspire, guide, and transform the global systemic and excellence quest for climate justice and energy security. Indeed, it would be an encouraging development to ensure that the capacity for renewable energy technologies in and for Africa is given special priority before 2030.

#### 4.7 THE PEACE AND JUSTICE PRINCIPLE

This unpacks the intrinsic interdependence between climate justice and global peace. These are deeply intertwined sides of the same coin. Climate injustices are increasingly a “threat multiplier” in the climate emergency. Among others, this principle upholds the following critical tenets: a paradigm shift<sup>83</sup> from mere growth and productivity to solidarity with and for climate, gender, security, equality, sensitivity, and inclusiveness in climate issues, and from their coexistence with fellow humans and planetary goods, to holistic and dignified

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<sup>82</sup> The United Nations (UN) “Theme Report on Enabling SDGs Through Inclusive Just Energy Transitions”, United Nations, 2021.

<sup>83</sup> Aidan G. Msafiri, Globalization of Concern I: Essays on Education, Health, Climate Change and Cyberspace. Geneva, Globethics.net Focus No. 8, pp. 48-50.

brotherhood/sisterhood with and for all, and finally from destructive silence to impactful, sustainable action as a whole.

#### **4.8 THE PRINCIPLE OF CLIMATE FINANCE AND JUSTICE**

Climate finance emphasises the necessity and urgency of large-scale funding for climate action, especially for the least developed and vulnerable nations, as a critical alternative instrument and “toolkit” for holistic justice in East Africa's overall burden-sharing. This is because there is a clear interrelationship between climate justice and climate finance. Its aim (climate finance) is specifically to decarbonise the planet by reducing greenhouse gas (GHG) emissions. Consequently, enhance carbon sinks and reduce vulnerability to human biodiversity and ecosystems. Further, according to the Mary Robinson Foundation for Climate Justice (2017),<sup>84</sup> climate justice must incorporate respect for and protection of human and fundamental rights; strengthen the right to integral human development; ensure the equitable distribution of both the benefits and burdens of climate vulnerability; guarantee that climate-related decision-making is participatory, transparent, and consequential; promote gender equality and equity; harness the transformative potential of education for sustainable livelihoods; and make effective use of partnerships in advancing climate justice at both local and global levels. The 2015 Paris Agreement substantially reinforced this principle, particularly in the contexts of development finance, adaptation, mitigation, and loss and damage, more than ever before.

#### **4.9 THE PRINCIPLE OF COMMON BUT DIFFERENTIATED RESPONSIBILITIES (CBDR)**

First, it underscores both the historical responsibility and the current and future capabilities and initiatives for decarbonisation, as outlined in the 1992 UNFCCC Convention, the Kyoto Protocol, and the Paris Agreement at COP 21 in December 2015. This principle of common but differentiated responsibilities (CBDR) has notable strengths and significant potential, but also inherent discrepancies, limitations, and gaps. Nonetheless, it provides a valuable starting point for reflection on climate justice and accountability.

Second, the CBDR principle aims to limit indiscriminate emissions and contamination by keeping global warming below 2 °C and above pre-industrial levels through concerted action at both national and global levels. Among other things, this requires credible climate change policies, treaty negotiations, and conventions.

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<sup>84</sup> Cfr. [www.mrf.org](http://www.mrf.org) searched on the 14<sup>th</sup> May, 2024.

#### 4.10 THE PRINCIPLE OF CLIMATE ADAPTATION

This aims to systematically reduce negative climate change risks and vulnerability, mainly through transformative action, inclusive growth policy adjustments, prioritisation, climate strategies, awareness-raising, planning, capacity building, the management of synergies among natural disasters, macro-fiscal issues, and monitoring. The 2015 Paris Agreement underscored the relevance and timely nature of establishing National Adaptation Plans (NAPs)<sup>85</sup> particularly in building adaptation capacities and opportunities of the most vulnerable and poorest developing nations.

#### 4.11 THE MITIGATION PRINCIPLE

It underlines individual and collective efforts to reduce, prevent and trap greenhouse gas emissions (GHGs) in the atmosphere<sup>86</sup> and the planet. Fundamentally, the goal of this principle is to “avoid significant human interference with the climate system and stabilise greenhouse gas levels in a timeframe sufficient to allow ecosystems to adapt naturally to climate change, ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner”.<sup>87</sup> Among other strategies for operationalising the mitigation principle are promoting innovative and sustainable energy technologies, prioritising climate resilience, and mainstreaming climate change considerations across all development endeavours worldwide.<sup>88</sup>

All these principles offer significant strengths and potential to build a better planet and sustainable livelihoods. Nonetheless, they entail multiple gaps, limitations, missing links, and discrepancies, such as the politicisation and commercialisation of the climate change landscape, propaganda and COPs, the unsustainable effects of the hyper-consumerist culture globally, gaps in climate policies, and the perpetuation of fossil-intensive energy consumption patterns, to mention a few.<sup>89</sup> The world, and Africa in particular, needs a new, credible, transformative climate justice paradigm more than ever before.

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<sup>85</sup> United Nations Framework Convention On Climate Change COP 21 and CMP 11 Summary for Policy Makers 2015 Paris Agreement 30<sup>th</sup> November – 11<sup>th</sup> December, 2015.

<sup>86</sup> Cfr. [www.climate.nasa.gov](http://www.climate.nasa.gov) searched on the 15<sup>th</sup> May, 2024.

<sup>87</sup> Cfr. United Nations Intergovernmental Panel on Climate Change 2014 p. 4.

<sup>88</sup> Cfr. [www.gef.org](http://www.gef.org) searched on the 16<sup>th</sup> May, 2024.

<sup>89</sup> Obiera F. Ike, Justus Mbae *et al.* (eds) *Mainstreaming Ethics in Higher Education*. Geneva, Globethics.net Vol. 1 2019 pp. 463-467 passim.

# CHAPTER FIVE: THE NATIONALLY DETERMINED CONTRIBUTIONS (NDC'S) REGIME AND ARCHITECTURE

## 5 INTRODUCTION

### 5.1 MEANING/DEFINITION

#### 5.1.1 NATIONALLY DETERMINED CONTRIBUTIONS<sup>90</sup>

This refers to a conscientious, systematic climate action plan undertaken by parties to reduce greenhouse gas emissions and to adapt to climate-related vulnerabilities and risks. The 2015 Paris Agreement, in particular, spearheaded this. The Nationally Determined Contributions' key goal is specifically to initiate “a transformative shift to development that is greener and more sustainable... shifts in the different sectors of the economy, and that provides an opportunity for rethinking how a society produces and consumes...”<sup>91</sup> This terminology epitomises the “bottom-up” approach rather than the “top-down” one.

#### 5.1.2 RATIONALE OF NATIONALLY DETERMINED CONTRIBUTIONS

The justification for the inception of Nationally Determined Contributions (NDCs) lies in the acute global climate emergency and an urgent call to decarbonise the planet through collective action by all Parties, grounded in equity and sustainability, and informed by the best available science and innovative climate solutions. Arguably, the NDCs are an integral component of the Paris Agreement, which requires each party or nation to prepare,<sup>92</sup> communicate, and foster the NDCs to reduce climate vulnerability caused by ever-worsening emissions. From a jurisprudential perspective, some elements of the 2015 Paris Agreement regarding NDCs are legally binding, while others are not.

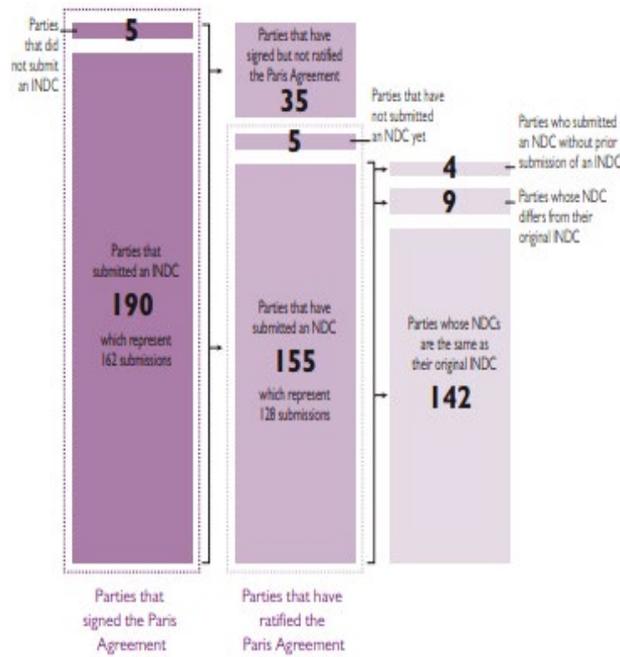
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<sup>90</sup> www.un.org searched on the 16<sup>th</sup> May, 2024.

<sup>91</sup> Ibid.

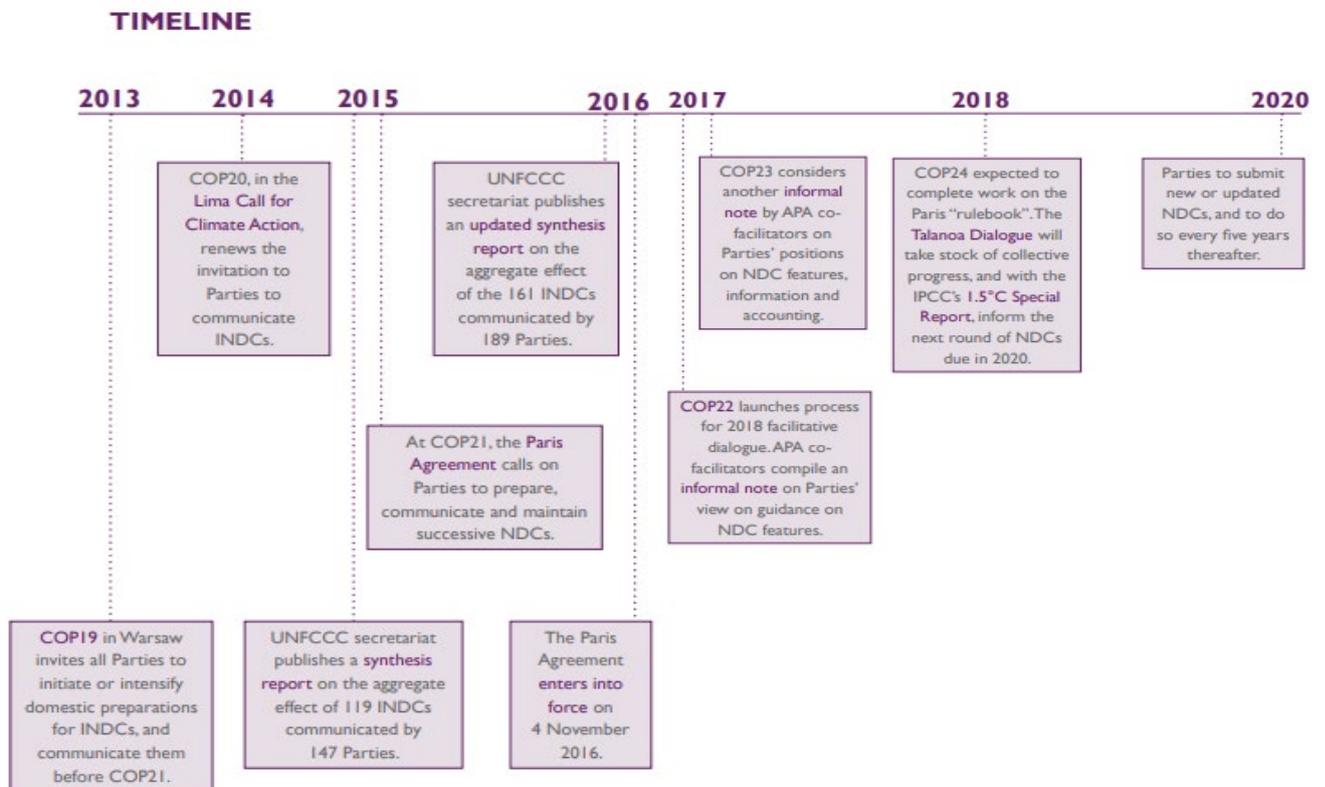
<sup>92</sup> Cfr. Paris Agreement Article 4, paragraph 2, 2015. Read also 4.3-4.6, 4.8-9, 4.12 and Article 6, 7, 13.7b-11 and 14.

5.1.3 NATIONALLY DETERMINED CONTRIBUTIONS SUBMISSION STATUS: FROM 1<sup>ST</sup> SEPTEMBER, 2017



(Source: <https://transparency-partnership.net>)

5.1.4 NATIONALLY DETERMINED CONTRIBUTIONS TIMELINE



(Source: <https://transparency-partnership.net>)

#### 5.1.5 NATIONALLY DETERMINED CONTRIBUTIONS (NDCs) LEGAL STATUS

First, in addition to their strengths and potential, particularly collective global decarbonisation and effective adaptation efforts, not all elements of the Paris Agreement related to NDCs are legally binding. In most cases, the ambition factor remains as a national resolve. Nonetheless, the following NDC-related aspects are mostly procedural. Hence, legally binding for all parties:

*“Prepare, communities and maintain NDCs. Pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions. Provide information necessary for clarity, transparency, and understanding (CTU) in communicating NDCs. Communicate NDCs every five years. Account for NDCs and promote environmental integrity, transparency, accuracy, completeness, comparability and consistency and ensure the avoidance of double counting. Regularly provide information on national inventories of emissions by sources and removals by sinks of GHGs and information necessary to track progress made in implementing and achieving NDCs.”<sup>93</sup>*

#### 5.1.6 KEY CONTENTS OF NATIONALLY DETERMINED CONTRIBUTIONS

According to Article 4.2 of the Paris Agreement, parties must “include a mitigation contribution in their NDCs, as the most explicit provision regarding the component of NDCs. The Lima call for action also invites Parties to consider communicating their undertakings in adaptation planning or including an adaptation component in their NDCs.”<sup>94</sup> This Article resonates, both directly and indirectly, with the trajectories of mitigation and adaptation, as well as with financial support, technology transfer, capacity-building, and transparency of action and support, all of which are central and urgent.<sup>95</sup>

#### 5.1.7 MECHANISM FOR PARTIES' ACCOUNTABILITY

First, besides the diverse, challenging, and complex nature of mapping mitigation targets in their NDCs, the Paris Agreement unpacked multiple trajectories for accountability with and among Parties, in particular:

*“Up-front information to be provided by Parties when submitting their NDCs (Article 4.8). According to the Parties of their NDCs (Article 4.13). Accounting by Parties of ITMOs (Article 6.2). Common modalities, procedures and*

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<sup>93</sup> Cfr. European Capacity Building Initiative (ECBI) Pocket Guide to NDCs, 2018, p. 14 of 90.

<sup>94</sup> Cfr. Paris Agreement Article 4.2.

<sup>95</sup> Cfr. UNFCCC, Guide to Negotiations: Summary for Policy Makers. Paris Agreement pp. 21-23 passim.

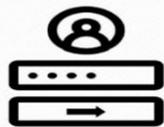
*guidelines for the transparency of action and support (Article 13.13), which could include rules on the information to be provided by Parties under Article 13.7 on their progress in implementing and achieving their NDCs.”<sup>96</sup>*

Second, the UNFCCC has provided a highly systematic and user-friendly framework and guide for Parties to submit their NDCs. It entails creating a UNFCCC user account, accessing the interim NDC registry to submit NDC-related documents and/or key information, and publishing NDC-related documents in the registry.

## Submission of Nationally Determined Contributions (NDCs)

A brief guide for Parties about the submission procedures of nationally determined contributions (NDCs) to the UNFCCC secretariat  
Version as of 2 December 2021

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**Create an UNFCCC user account**

The national focal point (or designated user) of each Party creates an UNFCCC user account at:  
<https://userregistration.unfccc.int>

If the national focal point (or designated user) has already an UNFCCC user account, no need to open a new one.

In case password has been forgotten, please reset it at: <https://passwordreset.unfccc.int>

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**Get access to the interim NDC registry**

Indicate which UNFCCC user account should get access to the interim NDC registry by writing to:  
[ndc@unfccc.int](mailto:ndc@unfccc.int) or  
[tools.support@unfccc.int](mailto:tools.support@unfccc.int)

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**Submit NDC related documents to the interim NDC registry**

Log in to the interim NDC registry using the UNFCCC user account, for which access has been granted, at:  
<https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>

Upload NDC related documents to the interim NDC registry following the steps outlined in the manual available at:  
[https://unfccc.int/files/focus/indc\\_portal/application/pdf/ndc\\_parties\\_userguide\\_version\\_1\\_may\\_2016\\_\(2\).pdf](https://unfccc.int/files/focus/indc_portal/application/pdf/ndc_parties_userguide_version_1_may_2016_(2).pdf)

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**Publication of NDC related documents**

After a simple consistency check, all the submitted NDC related documents are recorded and published at:  
<https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>

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**Obtain technical assistance**

For any technical assistance and/or queries in using the interim NDC registry, please write to:  
[ndc@unfccc.int](mailto:ndc@unfccc.int) or  
[tools.support@unfccc.int](mailto:tools.support@unfccc.int)

(Source: <https://unfccc.int>)

<sup>96</sup> Ibid., Paris Agreement 2015.

#### 5.1.8 TRACKING PROCEDURES OF NDCS: A WORLD RESOURCES INSTITUTE'S MODEL

First, this model enables real-time tracking and analysis of Nationally Determined Contributions (NDCs), providing policymakers with critical tools to advance the objectives of the 2015 Paris Agreement. Second, Climate Watch plays an important role in raising awareness by supporting countries in progressing towards their climate and sustainable development goals. Third, from a technical perspective, the World Resources Institute's Climate Watch platform operates as an open data system that brings together dozens of datasets, allowing users to search, analyse, and compare NDCs; access the most recent historical emissions data; explore how countries can leverage climate commitments to achieve sustainable development objectives; and use modelling tools to map pathways towards a low-carbon and climate-resilient future.<sup>97</sup>

#### 5.1.9 NATIONALLY DETERMINED CONTRIBUTIONS: A BRIEF SYNOPSIS ON TANZANIA'S MODEL

##### a) On Adaptation Contributions

First, according to the NDC report of July 2021 by the government of Tanzania, it envisages *“embarking on a climate resilient development pathway. In doing so, it will reduce the impacts of climate change variability and associated extremes such as droughts and floods... The adaptation measures are expected to significantly reduce the risks of climate-related disasters... Access to clean and safe water for the total population in urban and rural areas will be increased from 86% and 67.7%, respectively, in 2015 to 100% by 2030. Based on a conservative and a worst-case scenario of 50cm and 1m sea level rise by 2100, the contribution will verifiably reduce the impacts of sea level rise to the islands and coastal communities, infrastructure and ecosystems, including mangroves...”*<sup>98</sup>

Second, Tanzania's adaptation measures, as articulated through its adaptation priority mapping, seek to address multisectoral gaps and challenges across a wide range of sectors. These priorities include agriculture and livestock;<sup>99</sup> energy; coastal and marine environments and fisheries; water, sanitation, and hygiene; tourism; land use and human settlements development; health; infrastructure; disaster risk reduction and management; gender mainstreaming; capacity-building; research and systematic monitoring; and technology development and transfer.

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<sup>97</sup> [www.wri.org/ndcs/tracking-progress](http://www.wri.org/ndcs/tracking-progress) searched on the 15th May, 2024.

<sup>98</sup> The United Republic of Tanzania Vice President's Office, Nationally Determined Contribution. July 2021 p. 7.

<sup>99</sup> *Ibid.*, pp. 9-13 passim.

b) On Mitigation Contributions

First, the Tanzanian government has carefully identified four critical sectors as priority areas due to their significant potential for decarbonisation. Hence, “*Tanzania will reduce greenhouse gas emissions economy-wide between 30-35% relative to the Business-As-Usual (BAU) scenario by 2030, whereby about 138-153 million tons of carbon dioxide equivalent (MtCO<sub>2</sub>e) gross emissions are expected to be reduced, depending on the baseline efficiency improvements, consistent with its sustainable development agenda. Priority mitigation sectors are energy, transport, forestry and waste management. These are amongst the sectors that contribute to GHG emissions in Tanzania currently, and are expected to increase...*”<sup>100</sup>

Second, due to its vast and reliable natural gas endowments of an estimated 57 trillion cubic feet of discovered reserves (by 2021), and over 100 million cubic feet have been exploited to produce 527 MW,<sup>101</sup> Tanzania is determined to embark towards an eco-friendly energy transition or *Anantgarde*.

Third, from a waste management perspective, the Tanzanian government is mobilising both the private sector and local communities to enhance participation in waste-to-energy initiatives, the development of innovative waste management models, improved waste disposal and site management systems, and the promotion of recycling, reuse, and reduction practices, particularly in support of power generation programmes.

Fourth, among other critical components, effective and efficient implementation of Tanzania’s NDCs requires robust supporting systems. These include a measurement, reporting, and verification (MRV) framework; clear institutional and governance arrangements; adequate technical and professional capacity; and a comprehensive NDC database.<sup>102</sup>

Lastly, other existing players and tools involve carbon credits through the Clean Development Mechanism (CDM), the REDD+ mechanism (Reducing Emissions from Deforestation and Forest Degradation), or similar mechanisms. These are increasingly widespread models for decarbonisation and compensation, particularly in poor and developing nations, including Tanzania.

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<sup>100</sup> Ibid., p. 13.

<sup>101</sup> Ibid., p. 14.

<sup>102</sup> Cfr. Ibid., pp. 19-21 passim.

#### 5.1.10 NATIONALLY DETERMINED CONTRIBUTIONS THROUGH URBAN CLIMATE ACTION: A UN-HABITAT GUIDE MODEL

First, according to a model developed by UN-Habitat, cities in almost every country are expanding rapidly, and urban areas are central to achieving national emissions reductions and strengthening adaptive capacity. Currently, approximately 4.2 billion people, representing 55% of the world's population, live in urban settlements. This figure is projected to rise to 6.7 billion people, or 68% of the global population, by 2050.<sup>103</sup>

Second, the IPCC Special Report (2018) identifies the urban sector and infrastructure systems as key areas requiring an urgent transition, alongside energy, land use, and industry. Cities are particularly vulnerable to the impacts of climate change, including groundwater depletion, fires, food insecurity, sea-level rise, rising average and extreme temperatures, and the increasing frequency and intensity of extreme weather events such as floods, droughts, and storms. These impacts place significant strain on urban infrastructure and disproportionately affect the livelihoods, health, and well-being of urban residents.<sup>104</sup>

It must, however, be acknowledged that NDCs and their implementation mechanisms are neither value-neutral nor flawless. They exhibit both strengths and limitations. Nonetheless, they can serve as effective instruments in national and global efforts to decarbonise and promote sustainable livelihoods.

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<sup>103</sup> UN Habitat for a Better Urban Future, Nairobi 2020 p. 11.

<sup>104</sup> Ibid., p. 13.

# CHAPTER SIX: CLIMATE RESILIENCE REGIME AND ARCHITECTURE

## 6 INTRODUCTION

### 6.1 PREAMBLE

The term resilience has its origins in the Latin word “resilire”, which connotes “leap back”.

Fundamentally, climate resilience refers to “the ability to anticipate, prepare for, and respond to hazardous events, trends or disturbances related to climate.”<sup>105</sup> Generally, Allen, Gunderson, and Holling (2010:4) describe resilience as “the property that allows the fundamental functions of an ecosystem to persist in the face of extremes of disturbances... It is the property that resists departure from equilibrium and that maximises the speed of return to the equilibrium following small disturbances...”<sup>106</sup> Indeed, there is an intrinsic nexus and interdependence among ecological, climatic, adaptive, socio-economic, and human resilience regimes. They constitute a key, holistic edifice of resilience for all.

### 6.2 THE PANARCHY THEORY AND HOLISTIC RESILIENCE

The term *panarchy* is derived from the Greek word “pan”, which implies the good of nature and “*archy*”, which implies “rules”. Briefly, “panarchy” connotes “rule/laws of nature”, “principle of nature”, “natural law”, etc. Allen *et al.* (2014) define panarchy as “a conceptual model that describes the ways in which complex systems of people and nature are dynamically organised and structured across scales of space and time.”<sup>107</sup> In the same vein of thought, Gunderson *et al.* observe that this theory, particularly “in ecological and other complex systems, abrupt changes occur as a result of the interaction of slow broad variables...”<sup>108</sup> Panarchy theory highlights the critical role and implications of the adaptive cycle, particularly in understanding climate, ecological, and socio-economic dynamics and transformation pathways.<sup>109</sup>

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<sup>105</sup> www.c2es.org searched on the 15<sup>th</sup> May, 2024.

<sup>106</sup> Lance H. Gunderson, Graig R. Allen and C.S. Holling (eds) Foundations of Ecological Resilience. Washington DC, Island Press, 2010 p. 4.

<sup>107</sup> Allen *et al.*, 2014, www.passelzunl.ed searched on the 17<sup>th</sup> May, 2024.

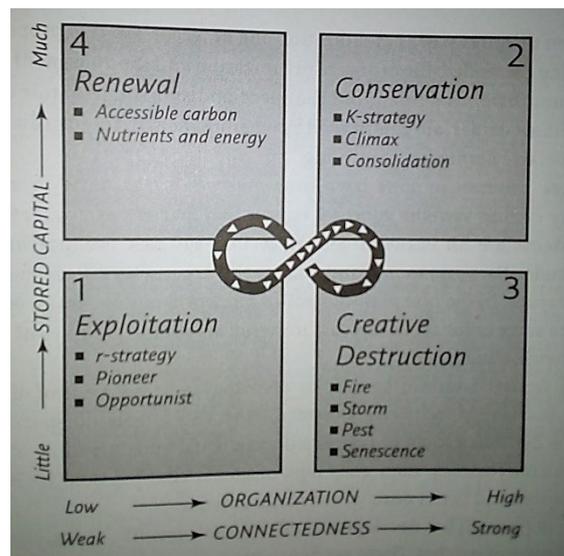
<sup>108</sup> Ibid., Lance H. Gunderson *et al.*, p. 431.

<sup>109</sup> Ibid.

### 6.3 PRINCIPLES FOR HOLISTIC/INTEGRAL RESILIENCE THINKING<sup>110</sup>

#### 6.3.1 DIVERSITY AND REDUNDANCY<sup>111</sup>

It argues that all socio-climatic, economic, biological, technological, institutional, human, cultural, and knowledge systems, as well as players, should respond effectively and efficiently to unforeseeable predicaments and risks. Among other things, this could be achieved by maximising conservation efforts, valuing redundancy, and fostering ecological resilience, biological diversity, and ecosystem services.



*The four ecosystem functions and their relationship to the amount of stored capital and the degree of connectedness. The arrowheads show an ecosystem cycle. The interval between arrowheads indicates speed: a short interval means slow change, and a long interval means rapid change.*

#### 6.3.2 THE PRINCIPLE OF CONNECTIVITY MANAGEMENT

Undoubtedly, high levels of positive and transformative connectivity have substantial potential to restore ecosystem services. This can be operationalised by strengthening, among others, key foundations related to resources, biodiversity systems, and socio-environmental and economic systems as a whole. Briefly, resilient ecosystems can be effective, particularly through the identification and reinvigoration of map connectivity, critical elements and interconnections, restoration and optimisation of connectivity landscapes and regimes.<sup>112</sup>

<sup>110</sup> Cfr. [www.stockholmresilience.su.se](http://www.stockholmresilience.su.se) searched on the 17<sup>th</sup> May, 2024.

<sup>111</sup> Ibid.

<sup>112</sup> Ibid.

### 6.3.3 THE PRINCIPLE OF MANAGEMENT OF SLOW VARIABLES AND FEEDBACK

It underlines a continuous configuration<sup>113</sup> and re-organisation of different variables and systems interactively to provide distinctive ecosystem services and structures. Normally, “dampening feedback helps to counteract disturbance and change so that the system recovers and keeps working in the same way, producing the same set of ecosystem services.”<sup>114</sup> Among others, managing slow variables and feedback that support good regimes, avoiding actions that hide feedback, monitoring key show variables, and establishing governance of critical regimes.

From a Tanzanian perspective, for example, while “*feedback can help keep a system in a desirable regime, it can also lock a system into an undesirable configuration. For instance, in drought-prone areas, population growth has increased the demand for crop production and reduced fallow times. This has led to the depletion of organic matter in the soil and a drop in soil fertility. This, in turn, means that crop harvests are low and that farmers have little or no surplus to sell...*”<sup>115</sup>

### 6.3.4 THE PRINCIPLE OF COMPLEX ADAPTIVE SYSTEMS THINKING<sup>116</sup>

It nurtures two critical aspects necessary for the continuous use and benefit of multiple ecosystem services.

First, it abandons a destructive, unsustainable reductionist model of thinking. Second, it supports the idea that across socio-economic and ecological regimes, everything is interconnected. That is a web of interconnectedness. Hence, the complex adaptive thinking model (CAS) and lifestyle directly enhance the resilience of certain ecosystem conditions, services, and statures. The Kruger National Park in South Africa is a good example.

### 6.3.5 THE PRINCIPLE OF ENCOURAGEMENT OF LEARNING

This principle calls for a systematic and systemic enhancement of education, training, and experimentation. This is a critical trial as the best way to adapt, to change and uncertainty: “*Because socio-ecological systems are always in development, there is a constant need to revise existing knowledge to change and approaches to management. Adaptive management, adaptive co-management and adaptive governance all focus on learning as an integral part of the decision making and base their strategies on the fact that knowledge is incomplete, and that*

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<sup>113</sup> Ibid.

<sup>114</sup> Ibid., p. 8.

<sup>115</sup> Ibid., p. 9.

<sup>116</sup> Ibid., p. 10.

*uncertainty, change and surprise play an important part in managing socio-ecological systems...*<sup>117</sup> Among others, the following suggestions could be highly supportive and transformative for learning, strengthen long-term socio-ecological regimes, create opportunities for interaction and activism, engage diverse stakeholders, identify social contexts for knowledge sharing, ensure the availability of resources to support learning processes, and inspire community action and networking.<sup>118</sup>

#### 6.3.6 THE PRINCIPLE OF IMPROVEMENT OF PARTICIPATION

This principle underscores, in particular, the involvement of a wide range of key stakeholders, especially in managing socio-ecological regime systems. In return, these boost resilience by invigorating legitimacy, broadening the depth and heterogeneity of knowledge, detecting, assisting, and interpreting care and concern. At this juncture, participation *“can range from simply informing stakeholders to a complete devolution of power... An informed and well-functioning group have the potential to build trust and a shared understanding, both fundamental ingredients for collective action...”*<sup>119</sup> Among others, the following superimposed guidelines are critical, particularly for both operative and constructive participation: exposition of one’s goals and expectations; identification of a rightfully inspired and motivated group; capacity building; identification of power issues and challenges; and, finally, procurement of adequate multiple resources for effective and efficient participation.<sup>120</sup>

#### 6.3.7 THE PROMOTION OF POLYCENTRIC GOVERNANCE PRINCIPLE

It highlights critical dimensions of polycentricity whereby *“a governance system in which multiple governing bodies interact to make and enforce rules within a specific policy arena or location...”*<sup>121</sup> In contradistinction to more monocentric approaches strategies or models, *“polycentric governance is considered to enhance resilience of ecosystem services in six ways, which coincide elegantly with other principles it provides opportunities for learning and experimentation, it enables broader levels of participation; it improves connectivity; it creates modularity; it improves potential for response diversity and builds redundancy that can minimize and correct errors in governance...”*<sup>122</sup> Briefly, the underlying justification for the principle of polycentric governance lies in its suitability for achieving sustainable and effective management of socio-ecological systems. In particular, it enables the acceptability and

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<sup>117</sup> Ibid., p. 12.

<sup>118</sup> Ibid., p. 13.

<sup>119</sup> Ibid., p. 14.

<sup>120</sup> Ibid., p. 15.

<sup>121</sup> Ibid., p. 16.

<sup>122</sup> Ibid., p. 16.

inclusion of customary, traditional,<sup>123</sup> indigenous, and “orthodox” knowledge and skills, which can be accommodated within collective efforts to build credible and resilient socio-ecological systems as a whole. Conclusively, strictly speaking, resilience is neither a value-free nor a “ready-made” socio-ecological regime. It is a highly complex system, comprising both qualitative and quantitative phenomena and being highly interconnected and interdependent.

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<sup>123</sup> Ibid., p. 16.

# CHAPTER SEVEN: RENEWABLE/ALTERNATIVE ENERGY'S REGIME AND CLIMATE JUSTICE

## 7 INTRODUCTION

### 7.1 PREAMBLE

Renewable energy<sup>124</sup> is often referred to interchangeably as clean, green, alternative, eco-friendly, natural, and sustainable energy, among other synonyms. Fundamentally, renewable energy resources are replenishable. Factually, unlike “renewable resources, once a non-renewable resource is depleted, it cannot be recovered. As the human population continues to grow and finite resources become increasingly scarce, the demand for renewable resources increases”.<sup>125</sup> Renewable energy, therefore, has the potential to have greater positive impacts on the environment and climate than fossil fuel energy sources. This is the underlying reason renewable energy regimes and models are increasingly popular and necessary worldwide, particularly in Africa.

### 7.2 JUSTIFICATION/RATIONALE FOR ENERGY TRANSITION

First, the International Renewable Energy Agency (IRENA)<sup>126</sup> considers renewable energy (renewables) the most eco-friendly, innovative, efficient, cost-effective, and sustainable energy alternatives for decarbonising our planet. Undoubtedly, IRENA's performance is critical to bolstering the implementation of Nationally Determined Contributions (NDCs) in and by all nations, including those in Africa.

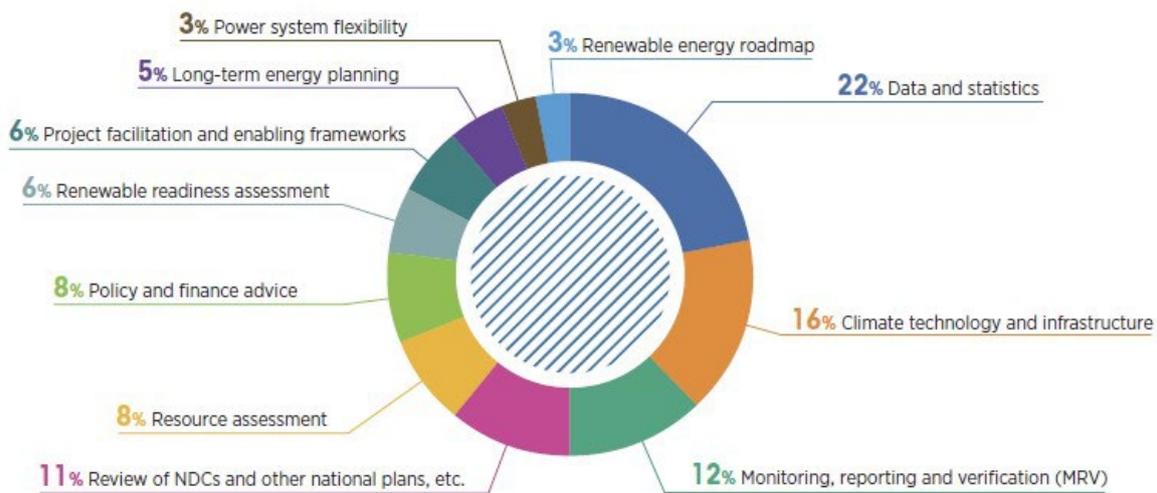
Second, IRENA has recently been engaging with 72 parties to the 2015 Paris Agreement to support their climate pledges and implement their existing climate action plans through the energy transition. This engagement covers a total population of around 1.8 billion people with a carbon footprint of 3.2 billion tons of carbon dioxide equivalent.

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<sup>124</sup> [www.nrdc.org/stories/renewable-energy-clean-facts](http://www.nrdc.org/stories/renewable-energy-clean-facts) searched on the 19th May, 2024.

<sup>125</sup> [www.investopedia](http://www.investopedia). Searched on the 19<sup>th</sup> May, 2024.

<sup>126</sup> [www.irena.org/publications/2021/NOV/IRENA-Energy-Transition-Support-to-Strengthen-Climate-Action](http://www.irena.org/publications/2021/NOV/IRENA-Energy-Transition-Support-to-Strengthen-Climate-Action) Searched on the 22<sup>nd</sup> May, 2024.



(Source: <https://www.irena.org/publications/2021/Nov/IRENA-Energy-Transition-Support-to-Strengthen-Climate-Action>)

Third, from a geopolitical energy transition perspective, hydrogen<sup>127</sup> has increasingly been recognised as a “missing” energy carrier in the global quest for decarbonisation. In this context, an in-depth scientific analysis has examined the untapped potential, geopolitical implications, and prospective benefits of the global energy transformation. This analysis is captured in the report *A New World: The Geopolitics of the Energy Transition*. The post-Russian invasion of Ukraine has further intensified the urgency for a critical and innovative rethinking of global energy security.

### 7.3 MAJOR TYPES OF RENEWABLES/RENEWABLE ENERGIES

#### 7.3.1 SOLAR ENERGY REGIME

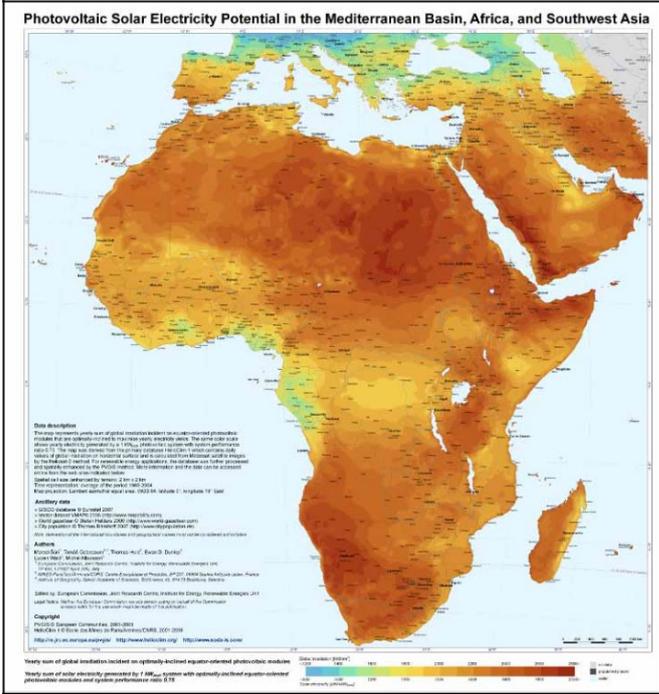
This is produced by capturing sunlight and converting it into heat, which warms homes, businesses, and industries and powers devices, equipment, and other uses. Today, solar energy technologies and applications are increasingly becoming very popular globally. Among others are the Kurnool Ultra Park and the Kamuth Solar Facility in India. These two provide about 1,000MW and 648 MV,<sup>128</sup> respectively. In Europe, for example, several of the continent’s largest solar projects illustrate the scale of recent renewable energy expansion. These include the Sabinar Photovoltaic Complex in Spain (252 MW), the Ballymacarney Solar PV Park in Ireland (200 MW), the Cádiz Photovoltaic Solar Complex in Spain (233.6 MW), the Devnya Solar Power Plant in Bulgaria (180 MW), and the Ptolemaida Solar PV Park in West

<sup>127</sup> Ibid.

<sup>128</sup> Ibid.

Macedonia, Greece (200 MW).<sup>129</sup> In addition, individual household-level private solar initiatives are increasingly being implemented across several European and non-European countries.

From an African solar power perspective, the continent’s potential and suitability are significantly greater. Illustrative examples include the Ouarzazate Solar Power Station in Morocco (580 MW), the Benban Solar Park in Egypt (approximately 1.6–1.8 GW), and South Africa’s De Aar Solar Capital (175 MW) and Kathu Solar Park (100 MW). Nonetheless, despite this considerable potential, challenges related to prioritisation, as well as persistent constraints in financial, technical, and human resources, remain critical barriers to large-scale deployment.



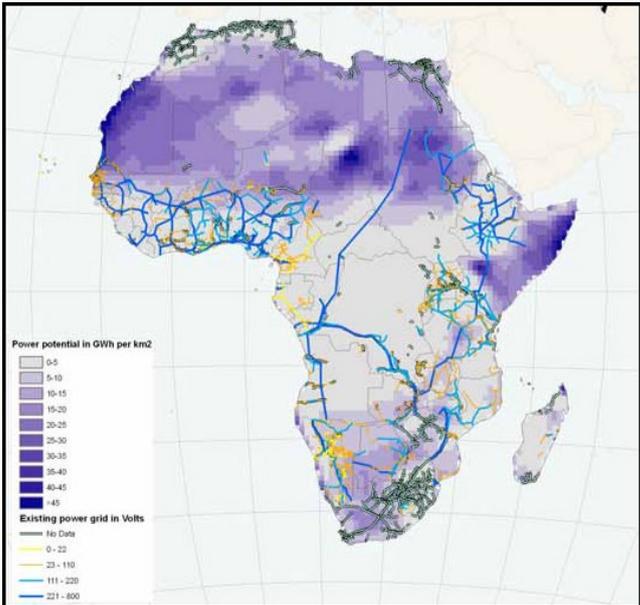
*Photovoltaic Solar electricity potential as computed by PVGIS (PVGIS, 2011)*  
*(Source: reqno\_jrc67752\_finalreport.pdf)*

7.3.2 WIND POWER REGIME

Wind energy is generated by the kinetic energy of spinning turbines, which convert mechanical motion into electrical energy for various uses. The top five biggest wind farms in the world include the Jiuquan Wind Power base in China (20GW), the Jaisalmer Wind Park in India (1,600MW), the Alta Wind Energy (AWEC) in California, USA (1,548MW), the Muppandel Wind Farm in India (1,500MW) and the Shepherds Flat Wind Farm in the USA (845MW).<sup>130</sup>

<sup>129</sup> www.power-technology.com.  
<sup>130</sup> Ibid.

Africa has not yet fully and effectively developed its wind energy potential. However, several wind energy projects in Africa warrant special mention for their scale and strategic significance. These include the Lake Turkana Wind Power Project in Kenya (310 MW), the Tarfaya Wind Farm in Morocco (301 MW), the Ras Ghareb Wind Farm in Egypt (262.5 MW), the West Bakr Wind Project in Egypt (250 MW), the Adama I and II Wind Farms in Ethiopia (204 MW), the Akhfenir Wind Farm in Morocco (200 MW),<sup>131</sup> and the Taiba N’Diaye Wind Farm in Senegal (158 MW). Together, these projects illustrate the growing role of wind energy in Africa’s renewable energy transition.



*Potential wind power production in GWh per km<sup>2</sup>, excluding regions with water bodies, forest, cities, and protected areas and assuming 5 turbines per km<sup>2</sup>. Overlaid is the position of available data on the existing power grid with capacity in kV.*

*(Source: reqno\_jrc67752\_finalreport.pdf)*

7.3.3 HYDRO-ELECTRIC POWER (HEP) REGIME

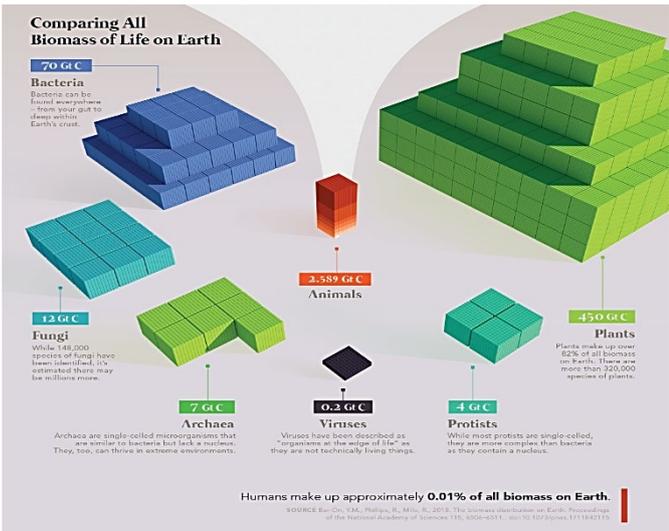
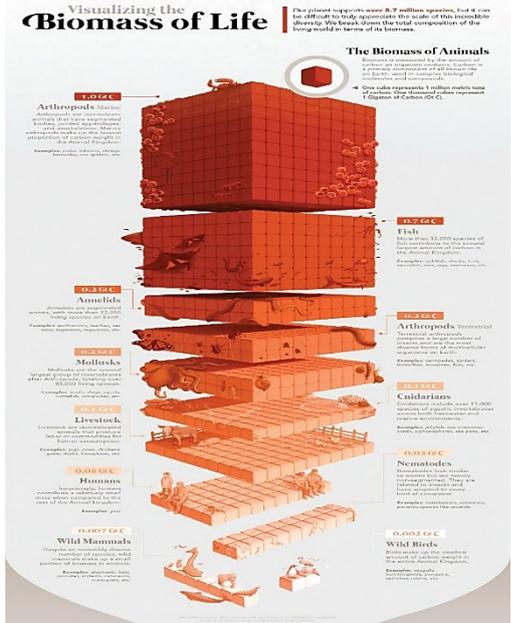
Hydroelectric power involves converting the kinetic and potential energy of water—whether from dams, rivers, marine currents, or tides—into electricity using turbines. Among the world’s largest hydroelectric plants are China’s Three Gorges Dam, with an installed capacity of about 22,500 MW, the Itaipu Dam on the Brazil–Paraguay border (14,000 MW), and China’s Xiluodu Dam (13,860 MW). Other major facilities include Brazil’s Belo Monte Dam (approximately 11,233 MW) and Venezuela’s Guri Dam (around 10,235 MW)—all of which illustrate the scale at which hydropower contributes to global renewable energy generation.

<sup>131</sup> www.energycapital.com searched on the 22<sup>nd</sup> May, 2024.

In Africa’s hydropower (HEP) landscape, several major plants stand out for their scale and strategic importance. These include the Grand Ethiopian Renaissance Dam in Ethiopia (6,450 MW); the Julius Nyerere Hydropower Station—also known as the Rufiji Hydroelectric Power Project or Stiegler’s Gorge Dam—in Tanzania, with an installed capacity of 2,115 MW and an estimated annual generation of approximately 5,920 GWh; the Aswan High Dam in Egypt (2,100 MW); the Cahora Bassa Dam in Mozambique (2,070 MW); and the Gilgel Gibe III Dam in Ethiopia (1,870 MW). In addition, the Inga Dams in the Democratic Republic of Congo—comprising Inga I (351 MW) and Inga II (1,424 MW)—together provide a combined installed capacity of approximately 1,775 MW.<sup>132</sup> It must, however, be noted that due to long-term, widespread climate vulnerability and prolonged droughts in Africa, in particular and globally, the HEP regime and power generation are increasingly fragile, inefficient, and unpredictable.

7.3.4 BIOMASS REGIME

This includes a variety of organic products and materials from plants (soil flora) and animals (soil fauna) that store energy. That is forest, agriculture, and waste. These originate from the 4F’s (Food, Feed, Fibre, and Fuel). This is made through a systematic combustion or igniting of such natural materials, such as “solid biomass like garbage or wood... Converting biomass into biogases such as methane or CO<sub>2</sub> due to the bacterial activity that happens in the absence of oxygen... using sugar or corn crops to create biofuels such as bioethanol or biodiesel and mixing them with fossil fuels afterwards...”<sup>133</sup>



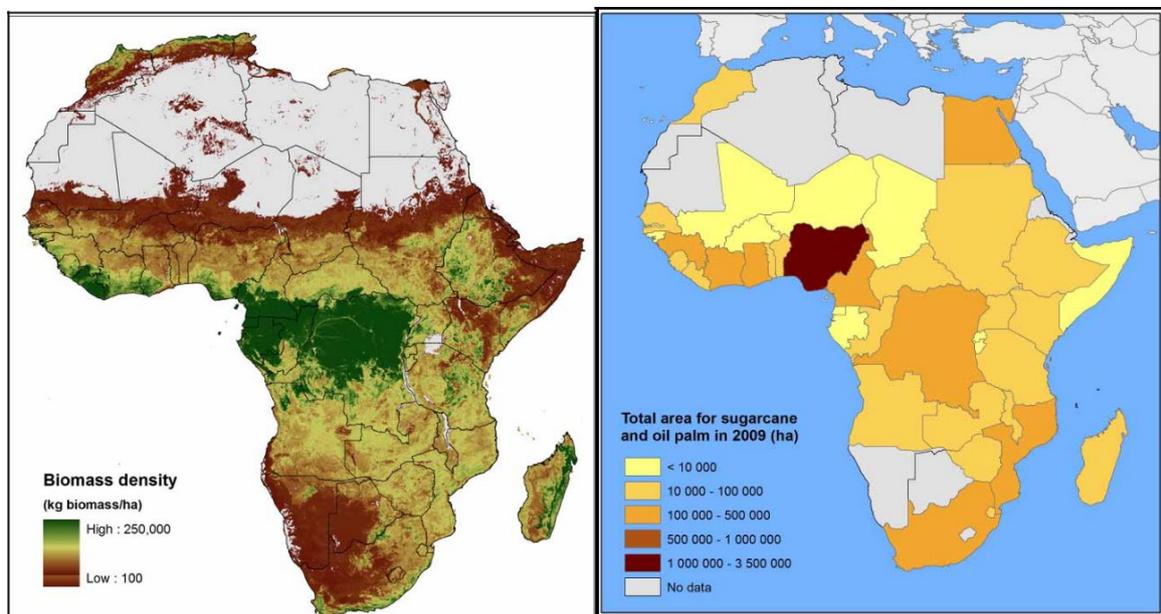
(Source: <https://www.visualcapitalist.com/all-the-biomass-of-earth-in-one-graphic/>)

<sup>132</sup> Ibid.

<sup>133</sup> [www.youmatter.world/en/definitions-renewable-energy-definition/](http://www.youmatter.world/en/definitions-renewable-energy-definition/) searched on the 22<sup>nd</sup> May, 2024.

Among others, some of the world’s largest biomass power plants include the Ironbridge Power Station in the United Kingdom (740 MW), Alholmens Kraft Power Station in Finland (100 MW), Toppila Power Station in Finland, which produces approximately 210 MW of electricity and 340 MW of thermal energy, the Połaniec Power Station in Poland (205 MW), and the Kymijärvi Power Station in Poland (160 MW). These facilities illustrate the significant contribution of biomass energy within the global renewable energy mix.<sup>134</sup> From an African biomass perspective, the continent possesses abundant biomass resources—often referred to as Africa’s “green gold”—although their distribution is highly uneven. Access to biomass resources and supporting infrastructure varies considerably across regions, and biomass is still widely used inefficiently. In 2009, total cropland devoted to sugarcane and oil palm cultivation in Africa amounted to approximately 6 million hectares, compared to 8.6 million hectares cultivated for sugarcane alone in Brazil. While bioenergy presents a significant opportunity for Africa’s energy transition and development, its expansion must be carefully managed to ensure environmental sustainability and to address associated social concerns.<sup>135</sup>

Biomass Density in the African continent (left) and Total Area Used to Produce Sugarcane and Oil Palm in Africa in 2009



(Source: <https://publications.jrc.ec.europa.eu/repository/handle/JRC67752>)

<sup>134</sup> www.bester.energy searched on the 22<sup>nd</sup> May, 2024.

<sup>135</sup> JRC European Commission Scientific and Technical Reports: Renewable Energies in Africa, 2011 p. 25.

### 7.3.5 THE GEOTHERMAL ENERGY REGIME

The term “geothermal” derives from the Greek words “geo” (earth) and “therme” (heat). Hence, geothermal energy is stored energy generated by the Earth's core, about 4,000 miles below the surface, resulting from the slow, continuous decay of radioactive materials.<sup>136</sup>

Geothermal power production harnesses hydrothermal resources, particularly subsurface heat and water, to generate electricity. Among the world's largest geothermal power plants are the: The Geysers Geothermal Complex in California, USA (approximately 1.2 GW), the Larderello Geothermal Complex in Italy (769 MW), the Cerro Prieto Geothermal Power Station in Mexico (720 MW), the MakBan Geothermal Complex in the Philippines (458 MW), the Salak Geothermal Power Plant in Indonesia (377 MW), CalEnergy Salton Sea Geothermal Plants in the USA (340 MW), and the Sarulla Geothermal Power Plant in Indonesia (330 MW). These facilities demonstrate the significant contribution of geothermal energy to the global renewable energy mix.<sup>137</sup>

From an African perspective, there is enormous potential for geothermal power production. However, this untapped resource—despite its significance for Africa's decarbonisation efforts—has not yet been fully explored or utilised. As of 2022, Kenya stands out as the continent's leading geothermal energy producer, with geothermal power contributing more than 40% of its national electricity generation. Kenya has successfully harnessed its geothermal resources, with an installed capacity of approximately 630 MW, of which nearly 400 MW have come online since 2014. Estimates by the Infrastructure Consortium for Africa and the United Nations Environment Programme suggest that Eastern Africa alone holds a geothermal potential of up to 20,000 MW. In this context, countries such as Tanzania, Uganda, Rwanda, Djibouti, Eritrea, and Comoros have undertaken preliminary exploration activities to assess their geothermal potential.<sup>138</sup>

Renewable energy and technologies play a critical role, offering a sustainable, efficient, cost-effective, and decarbonisation-focused alternative to fossil fuels. Consequently, fostering a better planet and climate justice through alternative green energy production models and efficiency revolution as a new *Eco-Avantgarde*.

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<sup>136</sup> [www.ei.lehigh.edu](http://www.ei.lehigh.edu).

<sup>137</sup> [www.power-technology.com](http://www.power-technology.com) searched on the 23<sup>rd</sup> May, 2024.

<sup>138</sup> [www.diapiper.com](http://www.diapiper.com) searched on the 22<sup>nd</sup> May, 2024.

## CATEGORIES OF RENEWABLE ENERGY CONVERSION TECHNOLOGIES

Technology	Energy product	Application
<b>Biomass energy</b>		
Combustion (domestic scale)	Heat (cooking, space heating)	Widely applied; improved technologies available
Combustion (industrial scale)	Process heat, steam, electricity	Widely applied; potential for improvement
Gasification/power production	Electricity, heat (CHP).	Demonstration phase
Gasification/fuel production	Hydrocarbons, methanol, H <sub>2</sub>	Development phase
Hydrolysis and fermentation	Ethanol	Commercially applied for sugar/ starch crops; production from wood under development
Pyrolysis/production of liquid fuels	Bio-oils	Pilot phase: some technical barriers
Pyrolysis/production of solid fuels	Charcoal	Widely applied; a wide range of efficiencies
Extraction	Biodiesel	Applied; relatively expensive
Digestion	Biogas	Commercially applied
<b>Wind energy</b>		
Water pumping and battery charging	Movement, power	Small wind machines are widely applied
Onshore wind turbines	Electricity	Widely applied commercially
Offshore wind turbines	Electricity	Development and demonstration phase
<b>Solar energy</b>		
Photovoltaic solar energy conversion	Electricity	Widely applied; rather expensive; further development needed
Solar thermal electricity	Heat, steam, electricity	Demonstrated; further development needed
Low-temperature solar energy use	Heat (water and space heating, cooking, drying) and cold	Solar collectors are commercially applied; solar cookers are widely applied in some regions; solar drying demonstrated and applied
Passive solar energy use	Heat, cold, light, ventilation	Demonstrations and applications; no active parts
Artificial photosynthesis	H <sub>2</sub> or hydrogen-rich fuels	Fundamental and applied research
<b>Hydropower</b>	Power, electricity	Commercially applied; small and large-scale applications
<b>Geothermal energy</b>	Heat, steam, electricity	Commercially applied
<b>Marine energy</b>		
Tidal energy	Electricity	Applied; relatively expensive

Wave energy	Electricity	Research, development, and demonstration phase
Current energy	Electricity	Research and development phase
Ocean thermal energy conversion	Heat, electricity	Research, development, and demonstration phase
Salinity gradient / osmotic energy	Electricity	Theoretical option
Marine biomass production	Fuels	Research and development phase

(Source: <https://www.undp.org/sites/g/files/zskgke326/files/publications/chapter7.pdf>)

Indeed, across the African continent, renewable energy and related technologies should serve as a transformative game-changer and the primary pathway forward, offering innovative, environmentally sustainable, and inclusive solutions.

#### **7.4 RENEWABLE ENERGIES AND CAPACITY BUILDING FOR AFRICA**

##### **7.4.1 CAPACITY BUILDING**

It refers to a systemic process of developing skills, abilities, aptitudes, resilience, attitudes, cognitive capacities, competencies, and resources to enable socio-economic, environmental, human, communal, cultural, political, institutional, and academic transformation.

##### **7.4.2 TECHNOLOGICAL TRAJECTORIES FOR CAPACITY BUILDING**

First, Africa is particularly vulnerable to the impacts of climate change, underscoring the need for the global community to prioritise a profound “Great Transition” or “Renaissance” centred on the development and diffusion of a diversified mix of renewable and sustainable energy sources, to reduce greenhouse gas emissions in line with the 2 °C threshold. Second, sustainable livelihoods and resilient communities are intrinsically linked to technological leadership and excellence. In this regard, Renewable Energy World notes that the world’s top ten polysilicon manufacturers by production capacity (based on 2011 data) are concentrated outside Africa. Notably, none of these leading manufacturers has made significant investments on the African continent, highlighting a critical gap in global renewable energy value chains.



*(Source: <https://constructionreviewonline.com/biggest-projects/top-10-largest-wind-farms-in-the-world/>)*

#### 7.4.3 CLIMATE POLICIES, STRATEGIES AND ACTION TRAJECTORIES

First, the notion of a “Great Transition” as a pathway towards credible climate change policy and action must encompass several interrelated trajectories. These include:

- (a) dismantling entrenched structural and political barriers to change, including vested interests that perpetuate high-emissions pathways;
- (b) phasing out obsolete and ineffective policies whose strategies, processes, and substantive content no longer align with contemporary climate imperatives;
- (c) removing socio-economic and market barriers that impede the development, diffusion, and maturation of renewable and low-carbon energy technologies;
- (d) reforming low-carbon pricing models that fail to influence energy consumption behaviour meaningfully; and
- (e) critically reassessing carbon tax models to ensure greater effectiveness, impact, and efficiency in driving emissions reductions.

Second, there is a pressing need to operationalise the Paris Agreement of COP 21 as a genuine breakthrough in practice, transforming it into a universal framework for climate change governance applicable to and inclusive of all states.

Finally, the Paris Agreement should be further developed into a credible and coherent package of complementary legal and policy instruments, capable of supporting effective implementation, compliance, and accountability across jurisdictions.



*(Source: <https://mercomindia.com/eu-proposes-mandatory-rooftop-solar-for-all-new-buildings/>)*

# CHAPTER EIGHT: CLIMATE JUSTICE AND THE INTERFAITH CONTRIBUTION AND ECO-RESILIENCE

## 8 INTRODUCTION

### 8.1 PREAMBLE

Faith-Based Organisations are religious traditions or institutions whose intrinsic values are based on faith and/or beliefs and that have a mission, vision, core values, etc. Some synonyms for Faith-Based Organisations include church organisations, religious institutions, religious bodies, and spiritual organisations. Faith-Based Organisations (FBOs) comprise a range of traditional and contemporary faith or religious groups that provide socio-educational, economic, health, environmental, technological, infrastructural, and human services, practices, and values. From an environmental and climate justice perspective, there are significant and incredibly transformative conservation corps, old and new, with teachings, principles, norms, ethos, and liturgies for the care of the earth, ecology, and sustainable communities and livelihoods, locally and globally.

### 8.2 JUSTIFICATION/RATIONALE

The post-industrial world is increasingly characterised by intensified human (Anthropocene) activities, lifestyles, and global dynamics that directly and indirectly disrupt the planet's God-given or Creator-given systems of regeneration, resilience, and sustainability. In this context, the maxim *extra mundum, nulla salus* (“outside the world, there is no salvation”) underscores the inescapable reality that humanity's fate is inseparable from that of the Earth. This moment, therefore, demands an urgent SOS for the planet and the climate. Manifestations of this crisis include heightened climate vulnerability, widespread biodiversity loss and ecosystem collapse, rising sea levels, prolonged droughts, accelerated desertification, increasing concentrations of greenhouse gases (GHGs), the spread of invasive species, and the rapid melting of mountain glaciers and snowpacks—affecting communities and ecosystems at both local and global scales.

### 8.3 CLIMATE JUSTICE AND TRADITIONAL AFRICAN PERSPECTIVES

Among others, the following redefine the salient attributes of the traditional African eco-justice landscape and “software”.

### 8.3.1 THE SUPERNATURAL/METAPHYSICAL ORIGINS OF ENVIRONMENTAL AND CLIMATE GOODS

That is, a “creator-creature” relationship that requires the latter to demonstrate both personal and collective accountability as good and responsible caretakers of the entire universe. African traditional religions express myriad environmental and climate-justice myths, parables, legends, symbols, stories, riddles, and metaphors to underscore divine eco-justice altruism. Mbiti, for instance (1970:73-74)<sup>139</sup> aptly observes that nature, including climate goods, “is not an empty impersonal object or phenomenon, it is filled with religious significance. The physical and the spiritual are but two dimensions of one and the same universe. To African peoples, this religious universe is not an academic proposition; it is an experience...”

### 8.3.2 JUSTICE-ORIENTED BELIEFS AND VIEWS ON NATURAL RESOURCES

These entail traditional African teachings on equity and sustainability regarding natural resources, particularly water, traditional medicine, herbs, forests, food, land, and wildlife.

Traditional communities were and are seen as both custodians and stewards of climate goods and natural resources through community taboos, ethos, ethics, and climate-related liturgies, ceremonies, songs, prayers, and chants. From an eco-justice viewpoint, this is a profound traditional African vision of eco-interdependency, eco-interrelatedness, eco-equity, and eco-bondedness. That is, everything is not only related to everything, but everything needs to sustain the equilibrium with everything. Consequently, as “rational and unique human beings”, Homo Africanus has the responsibility to do justice to God’s creation by practising relational anthropocentrism against greed, consumerism, nihilism, and dictatorship over the natural world. That is holistic distributive and intergenerational justice with creation.<sup>140</sup>

## 8.4 ECO-JUSTICE IN ISLAM

The concept of eco-justice is a relatively new discourse in Islam. Nonetheless, the following characterise the entire fabric and key tenets of Islamic faith and tradition in the environment and climate.

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<sup>139</sup> John S. Mbiti, *African Religions and Philosophy*, New York, Doubleday 1970:73-74.

<sup>140</sup> Aidan G. Msafiri, *Globalization of Concern IV, How Relevant and Timely is Laudato Si for Africa?* Heiligenkreuz im Wrenerwald, Be&Be, 2019 p. 82. See also Roland Posin, *Hüter der Schöpfung: Die Erde heilen mit der weiebeit der Natur Völker*, München, Atlantis 2000 pp. 123-124 passim.



(Source: <https://fore.yale.edu/World-Religions/Islam/Ecojustice-Resources>)

#### 8.4.1 ISLAM THROUGH THE HOLY KORAN ATTRIBUTES THE ORIGINS OF THE UNIVERSE AND ALL CREATION, INCLUDING CLIMATE, TO THE SUPREME BEING ALLAH (GOD)

Cfr. Surah 36:82, 40:68, 3:47, 16:40. These underpin the theocentric trajectory of the universe.

#### 8.4.2 ISLAM SHUNS AND EXPLICITLY DISCOURAGES BRUTAL ACTIONS AND UNJUST TREATMENT TOWARDS ANIMALS

Among others, these include unnecessary caging, beating, branding, torture, etc. Furthermore, Islam forbids gladiatorial fights with or among animals for pleasure, sports, entertainment, circus shows, etc.<sup>141</sup> Islam distinguishes certain permissible animals for human consumption (“halal”) from illegal or harmful ones (“haram”).<sup>142</sup>

#### 8.4.3 NEW OR LATEST ISLAMIC ECO-JUSTICE MODELS AND DISCOURSE EMPHASISE THE FOLLOWING IN PARTICULAR

First, on relative anthropocentrism against the extreme North-Atlantic anthropocentric model and emphasis on collective wellbeing and holistic view (“maslahi”), stewardship (“khalifa”), and moderation (“zohd”). Seyyed Hosein Nasr and Mawil Izzi Dien are the most ardent proponents of this new, highly eco-justice-oriented model.<sup>143</sup> Second, according to Köhler,<sup>144</sup> the Holy Koran and all ecological goods or resources, including the climate, are analogically seen as twins. Consequently, underpinning rules, norms, and actions, which promote eco-justice, particularly at the individual and societal levels.

<sup>141</sup> Martin Forward and Alam Mohamed Islam in: Jean Holm Bowker John (eds) Attitudes to Nature, London. Printer Publishers, 1994, p. 92.

<sup>142</sup> Ibid., p. 93.

<sup>143</sup> Markus Vogt, Christliche Umweltethik, Freiburg, Herder, 2021, pp. 274–275 passim. Commenting on recent Islamic eco-justice views.

<sup>144</sup> Köhler Ayyub, Muslime im Umweltschutz in Orth 2002: 31-34. Also cited by Markus Vogt, Christliche Umweltethik 2021, p. 277.

## 8.5 JUDAISM AND ECO-JUSTICE

Among other things, the Jewish eco-justice edifice comprises the following distinctive attributes.



(Source: <https://fore.yale.edu/World-Religions/Judaism/Ecojustice-Resources>)

### 8.5.1 JUDAISM STRONGLY ACCENTUATES THE AESTHETIC QUALITY OF THE WORLD

As such, creation and all in dimensions points to the Creator, His Beauty and Holiness. Creation in turn (sun, moon, snow, forest, cedars, animals, etc.) metaphorically praises and renders praise to God (Psalm 148, 96, 19:1, 97, 1:6, 104), Humans are essentially endowed with, a unique stewardship role (Gen. 1:26-28 and 2:15). That is “*Homo Horticus*” and not mere “*Homo Faber*” or “*Homo Consumerismus*”. Humans are entrusted with God’s creation. The latter belongs to God (Psalm 24:1, 50:12; Exodus 19:5; Deut. 10:14). Leviticus 25:33 epitomises the eco-justice vision and practice of the Sabbath Jubilee year. The Gai principle underscores the DNA of Jewish eco-justice, emphasising the holistic (“Qomah”) relationship and human vision for the created world. According to Hava Tirosh Samuelson (2017:69), Jewish environmentalism simply “means extending the ethics of responsibility to include the environment...”<sup>145</sup>

### 8.5.2 JEWISH ECO-JUSTICE MODEL ENTAILS THREE BASIC ECO-ETHICAL PRINCIPLES, WHICH ARE KEY IN THE PERMACULTURE<sup>146</sup> MODEL

The latter promotes eco-justice both directly and indirectly. These include caring for the world (land, forests, and water), caring for people and society, and, finally, the equitable and just distribution of resources, as well as limiting unlimited consumption and production. In its broadest and deepest sense, care, eco-care, and eco-justice encompass care of faith, care of all life forms, care of rationality (intellect), care of the future, and, finally, care of property and wellbeing.<sup>147</sup>

<sup>145</sup> Hava Tirosh-Samuelson, *Judaism in Jenkins, Willis/Tucker, Mary E./Grim, John (Hg): Routledge Handbook of Religion and Ecology*, London/New York 2017, p. 69.

<sup>146</sup> Geoff Lawton *What is Permaculture*, <http://www.permaculturedesign.co.za> searched on the 25<sup>th</sup> October, 2024.

<sup>147</sup> Muhammed Haron, *Muslimische Einsichten und Antworten auf eine sich stet verändernde Umwelt in Mose & Asaah Awinongya*, Gabriel Faimau Klaus Vellguth (eds) *Mit Der Schopfung Leben Atmen*, Ostfildern, Grünwald, 2021.

## 8.6 GREEK VIEWS AND ECO-JUSTICE



(Source: <https://fore.yale.edu/World-Religions/Christianity/Ecojustice-Resources>)

The following underscores the basic tenets and characteristics of the Greek eco-justice edifice.

### 8.6.1 GREEK COSMOLOGICAL WORLD VIEWS AND MYTHOLOGIES

This underpins a profound interdependence and interconnectedness, particularly between: “*Oikos*” (household), “*Oikonomia*” (economy), “*Oikolojia*” (ecology), and “*Oikumene*” (interfaith). These four key trajectories relate to one another in just and sustainable ways, forming the entire web of life.

### 8.6.2 THE ARISTOTELIAN COSMOLOGICAL LIFE VIEW

This maintains the Creator's primal and transcendental (supernatural) role in creation as the primary agent and cause.<sup>148</sup>

### 8.6.3 GREEK ECOLOGICAL AND COSMOLOGICAL VIEWS

According to Greek ecological and cosmological views, it is narrated that “respecting the nature of everyone or anything is to be just to them. To impair or destroy that nature is violence and injustice”.<sup>149</sup> These underscore the basic eco-ethical principles of equality, equity, and harmony. Plato’s *Republic*, for instance, offers a substantially rich approach, particularly as regards “how justice leads to environmental sustainability. In book II especially, he provides an image of a city coming into existence in which, through temperance and wisdom, its inhabitants live within the limits of what their natural resources and their ingenuity can produce...”<sup>150</sup>

<sup>148</sup> Louke van Wensveen “Christian Ecological Virtue Ethics” in Dieter T. Hessel and Ruether Rosemary (eds) *Christianity and Ecology*, Cambridge, Massachusetts 2000, p. 164.

<sup>149</sup> Cfr. *Slonian Justice* CP, XLI (1946) 66. N. 18.

<sup>150</sup> Cfr. *Athens Journal of Humanities & Arts – Volume 5, Issue 1, January 2018* p. 117.

#### 8.6.4 THE GREEK GAIA PRINCIPLE OR THEORY

The Greek Gaia principle, per se, encapsulates the salient characteristics of the universe and all organisms for eco-justice, eco-equilibrium, and eco-resilience. Gaia's eco-justice model therefore regulates salinity in the oceans, oxygen in the atmosphere, global surface temperature, and maintains ecosystems, biodiversity, and all of Earth's systems.<sup>151</sup>

### 8.7 CHRISTIANITY AND ECO-JUSTICE

The following characterises the core and fundamental aspects of eco-justice within the Christian tradition.

#### 8.7.1 THE CREATED WORLD/UNIVERSE

Is viewed as emanating out of nothing (*ex ni hilo creatio*) from the Triune God (Gen. 1:26-31, 1Cor. 8:6, Rom. 11:36). This is both a gift and grace. In turn, this demands human accountability as responsible stewards, co-creators, and as "*Homo Horticus*" (Gen. 2:15). In this regard, this "stewardship" mandate calls for meaningful, fruitful, and sustainable human action and relationships for eco-justice, as implied and encapsulated in the image and likeness of God.

#### 8.7.2 JESUS OF NAZARETH

Extols the biblical faith in God the Father as the Creator (Mt. 11:25). Hence, He (Jesus) emphasises the harmonious Creator-Creature relationship through powerful eco-justice metaphors and imagery (Lk. 12:6; Mt. 6:26; John 4:35; Mt. 13:31-32).<sup>152</sup> These underpin the Christian eco-values of faith, mutuality, partnership, gratitude, Agape, and sufficiency.

#### 8.7.3 IN CHRISTIAN ECO-NARRATIVE, JESUS CHRIST

It is considered the centre of the created world (Col. 1:15ff). He is therefore understood as the Alpha (the Beginning) and the Omega (the End) of all creation. Within this framework, Jesus' mission and vision are fundamentally oriented towards and in solidarity with the anawim—the poor, the downtrodden, the oppressed, and the marginalised—a concern that also extends to injustices inflicted upon the planet itself (Mt 21:31–51; Lk 19:12–28).

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<sup>151</sup> Rosemary Ruether, *Gaia and God: An Eco-feminist Theology of Earth Healing*, San Francisco, Harper San Francisco, 1992 pp. 174-180 passim.

<sup>152</sup> Cfr. Pope Francis "*Laudato Si*" Nos 96-96.

#### 8.7.4 CHRISTIAN VIEW ON ECO-JUSTICE

It is essentially God’s creative love, spirit-centred, spirit-driven, and spirit-destined. The Holy Spirit, therefore, “works tirelessly so as to create, re-create, sustain, energise and orient human beings and non-humans in divine love and mutual solidarity”.<sup>153</sup> From an eco-justice spiritual view, Thomas Berry aptly maintains that “the Earth is our origin, our nourishment, our educator, our healer, our fulfilment. At its core, even our spirituality is Earth-derived. Humans and the Earth are deeply intertwined. If there is no spirituality in the Earth, there is no spirituality in ourselves”.<sup>154</sup> These views are the Christian eco-values of wholeness, interdependence, solidarity, and hope, arising from the Spirit of God for the created world.

#### 8.7.5 THE CHRISTIAN NARRATIVE AND VIEW OF ECO-JUSTICE

Revolves around the fundamental spiritual ethos and values for eco-justice, resilience, and sustainable livelihood. These are resonated in Christian gratitude (1Thes. 5:16-18, Ps. 67, 148:5, Col. 1:15-20, 3:12-16), humility (Luke 9:46-48, Mt. 11:29, Phil. 2:7-8), sufficiency (Luke 12:15, 9:25), justice (Isa. 58:6, 22, Luke 12:41-48, Ps 24:1, Mt. 5:3, Mk. 9:35, 2Kor. 12:10b), Agape (Mt. 22:37-39, John 15:12-14), peace (Mt. 10:34, John 14:27, Mt. 10:36), and faith and hope (Hebr. 11:1, Mt. 11:25).

#### 8.7.6 CHRISTIAN ECO-JUSTICE

This vision envisages the realisation of the “New Jerusalem” in contrast to “Babylon” (Rev. 21:1–3, 5, 25). The New Jerusalem is portrayed as a city of justice, equity, and life—God’s renewed dwelling on Earth (Rev. 21:2–3)—characterised by architectural and aesthetic excellence (Rev. 21–22; Isa. 65; Ez. 37; Isa. 60; Ps. 46; Sirach 15 and 24). It culminates in a powerful image of a restored Paradise City, where the water of life is offered as a divine gift to all created beings (Rev. 21:6; 22:17; Rev. 7:17; Ez. 47:1, 9–12).

#### 8.7.7 OTHER KEY CHRISTIAN ECO-JUSTICE TENETS INCLUDE

The sacramental dimension (Wisdom 11:22. Lev. 25:1-7, Deut. 10:14, “*Laudato Si*” Nos. 49, 91 and 159, *Evangelii Gaudium* No. 215, *Caritas in Veritate* Nos 48 & 51, *Centesimus Annus* No. 37 and *Sollicitudo Rei Socialis* No. 34). Christian (Catholic) Liturgy plays a significantly crucial role particularly in praising creation (Dan. 3:52-88, Ps. 19, Mt. 28:1, Rom. 6:3-11, Col. 1:12-20, Rev. 4:8 and 1Kor. 11:1ff). Finally, today the rich corpus of Christian eco-spirituality

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<sup>153</sup> Aidan G. Msafiri, Globalization of Concern IV How Relevant and Timely is *Laudato Si* for Africa? p. 91.

<sup>154</sup> Thomas Berry, “The Spirituality of the Earth” in Charles Birch, Eakin William (eds) *Liberating Life: Contemporary Approaches to Ecological Theology*, Maryknoll, New York, Orbis Books, 1990, p. 151.

and eco-justice calls for a profound interior conversion (Eco-metanoia). Consequently, as Pope Francis put it: “Living our vocation to be protectors of God’s handwork is essential to the life of virtue, it is not an option or a secondary aspect of our Christian experience.”<sup>155</sup>

## 8.8 CLIMATE JUSTICE AND INTERFAITH/ECUMENICAL VIEWS

Among others, the contemporary (interreligious), interfaith, and Ecumenical landscape, narrative, and model entail the following fundamental views, initiatives, and characteristics.

### 8.8.1 WORLD RELIGIONS AS CARETAKERS AND PROTECTORS

Climate justice and climate action require a systemic awareness rooted in the ethical, spiritual, and ecological teachings of diverse religious and Earth-centred traditions.<sup>156</sup> Fundamentally, the “Church’s strength lies in its prophetic witness to proclaim God’s love for the whole world and to denounce the philosophy of domination that threatens the manifestation of God’s love... The Central Committee of the WCC recognises the need for a drastic transformation at all levels in life and society in order to end the ecological indebtedness and restore the right relationship between people and between people and the earth...”<sup>157</sup>

### 8.8.2 INTERFAITH DISCUSSIONS

Today, interfaith discussions, forums, symposia, etc., increasingly view climate justice and the planet/earth as spaces for encounter, cooperation, partnership, and networking among diverse faith traditions more than ever before. As Jürgen Moltmann puts it, “If the missionary religion of history is to reach the ends of the earth, it must transform itself into a universal religion of the earth.”<sup>158</sup> This resonates with the very “software” of Pope Francis’s Encyclical “*Laudato Si*” as well. Furthermore, Jürgen Moltmann asserts that the “Hebrew Bible offers us an ‘earth religion’ in the form of the Sabbath year... Sabbath rest for the earth is blessed by God, for this year allows the land to become fruitful again. If the people observe the Sabbath for the earth, they will live securely in the land. If they disobey this command, they will be cast out of the land and scattered among the nations for 70 years... This old story gives us a grave warning: if we fail to observe the earth’s religion and force it to bear fruit constantly with artificial fertilisers, we will exhaust the ground and render it infertile. The deserts will spread, and droughts will become more frequent, and eventually the human race will disappear from the

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<sup>155</sup> “*Laudato Si*” No. 216.

<sup>156</sup> Cfr. European Christian Environmental Network (1999-2004).

<sup>157</sup> <https://www.oikumene.org/resources/documents/statement-on-eco-justice-and-ecological-debt> searched on the 1<sup>st</sup> November, 2024.

<sup>158</sup> Jürgen Moltmann, A Common Earth Religion: World Religions from an Ecological Perspective in: *The Ecumenical Review* 63.1 March 2011 Geneva. WCC Publication p. 23.

earth...”<sup>159</sup> Indeed, these trading scenarios are commonplace, characterising current climate injustice vulnerabilities and are challenged locally and globally.

#### 8.8.3 INTERFAITH ECO-JUSTICE NARRATIVE AND SPACE

Is emphatic on the “We All Guests on Earth”<sup>160</sup> climate justice altruism than ever before. This calls for collective global awareness and responsibility to care for, sustain, protect, and guide people, and to manage all earthly goods and resources, including the climate.<sup>161</sup>

#### 8.8.4 THE INTERFAITH/ECUMENICAL AND INTERRELIGIOUS

It endorses a more holistic and transformative vision of justice, including eco-justice. In its deepest and broadest sense, justice calls for a profound transformation of relationships within society and between humanity and the Earth. Justice is understood not merely as a legal or distributive concept, but as a gift of God’s grace—transformative justice—which emphasises the constructive task of building just, participatory, and sustainable communities grounded in care, responsibility, and ecological integrity.<sup>162</sup> Briefly, this is a new climate justice vision and action with and for Mother Earth, endorsing “harmony and balance among all and with all things, complementarity, solidarity and equality, collective well-being and people in harmony with nature...”<sup>163</sup> In the same vein, Jesse N. K. Mugambi emphasises that present-day human beings are not alone on this planet but coexist with other creatures whose intrinsic value must be recognised. He argues that humanity should contribute to nature rather than plunder it, echoing Mahatma Gandhi’s insight that while there is enough to meet everyone’s needs, there is not enough to satisfy unchecked greed. Similarly, drawing on Charles Birch, Mugambi underscores the ethical imperative that the wealthy live more simply so that the poor may do so as well.<sup>164</sup> Before COP21 in 2015, Narendra Modi and Francois Hollande made comments worth paraphrasing about climate justice. The two leaders maintain that “*an essential complement for our success: the change in habits and everyday behaviour, inspired by the spirit of justice... We have a lot to learn from each other’s treasures of tradition and wisdom. India and France, the homelands of Victor Hugo and Swami Vivekananda two nations that are*

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<sup>159</sup> Ibid., p. 24.

<sup>160</sup> Christopher Stückelberger, *We are All Guests on Earth*, Bangalore, Dharmaran Publications, 2010, p.4.

<sup>161</sup> Aidan G. Msafiri, *Globalization of Concern III*, Geneva, Globethics.net Focus No. 32, 2016, p.27.

<sup>162</sup> Justice, Peace and Creation Team, *World Council of Churches*, Geneva, WCC 2005, p. 15.

<sup>163</sup> Ulrich Duchrow and Franz J. Hinkelammert, *Interreligious Solidarity for Just Relations: Transcending Greed Money*, New York, Palgrave Macmillan, 2012, p. 200.

<sup>164</sup> Jesse N. K. Mugambi, “The Ecological Crisis: A Challenge to Churches in Africa and Abroad” in Lesmore Gibson Ezekiel and Jooseop Keum: “Conference on World Mission and Evangelism”, Geneva, WCC 2010, p. 152.

*different in their current levels of consumption, and yet animated by the same spirit of justice, and united by a belief in collective life... ”<sup>165</sup>*

## **8.9 SOME (RADICAL) IDEOLOGICAL AND PHILOSOPHICAL WORLD VIEWS AND MODELS ON ENVIRONMENTAL AND CLIMATE**

### 8.9.1 THE RADICAL AND EXTREMIST ANTHROPOCENTRIC WORLD VIEW OR MODEL

It exaggerates the rights of the human person at the expense of the planet and climate. Hence, the need for relative anthropocentrism.

### 8.9.2 THE BIOCENTRIC VIEW AND MODEL

This model emphasises the rights of animals and plants and, in doing so, rejects any undermining of the rights and dignity of both the human person and non-human entities within the natural world.<sup>166</sup>

### 8.9.3 THE COSMO-CENTRIC LIFE VIEW AND MODEL

Fundamentally, this model emphasises the collective rights of the physical world while neglecting those inherent to humans, soil flora (plants) and soil fauna (animals).

### 8.9.4 THE PATHOCENTRIC LIFE VIEW AND MODEL

This has its origins in the Greek term “pathos”, which connotes pain, suffering, torment, affliction, or torture. Indeed, from an eco-justice and climate justice perspective, this radical life view overemphasises the rights of animals, plants, and the cosmos, including climate goods and resources.<sup>167</sup>

### 8.9.5 THE POST-MODERN HYPER (“TURBO”) CONSUMERIST LIFE VIEW/LIFESTYLE

An ever-increasing insatiable craving for limitless production and consumption primarily fuels this. Metaphorically, the Cartesian philosophical argumentation “*cogito ergo sum*” life view (“I think, therefore I am”) is systematically being replaced by this model: “I buy, therefore I am”, “I consume, therefore I am”, “I produce, therefore I am”, “I crave, therefore I am”, etc.<sup>168</sup> Unfortunately, this model exacerbates insurmountable climatic and environmental injustices, burdens, risks, and vulnerabilities for hundreds of years to come. That is true in both short-, medium-, and long-term scenarios.

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<sup>165</sup> Insitut De Recherche Pour le Development, Ecology of Our Worlds Marseille, IRD Editions, 2015 p. 12.

<sup>166</sup> Aidan G. Msafiri, Globalization of Concern I, Dar es Salaam. Dar es Salaam University Publishers, 2008 pp.54-55.

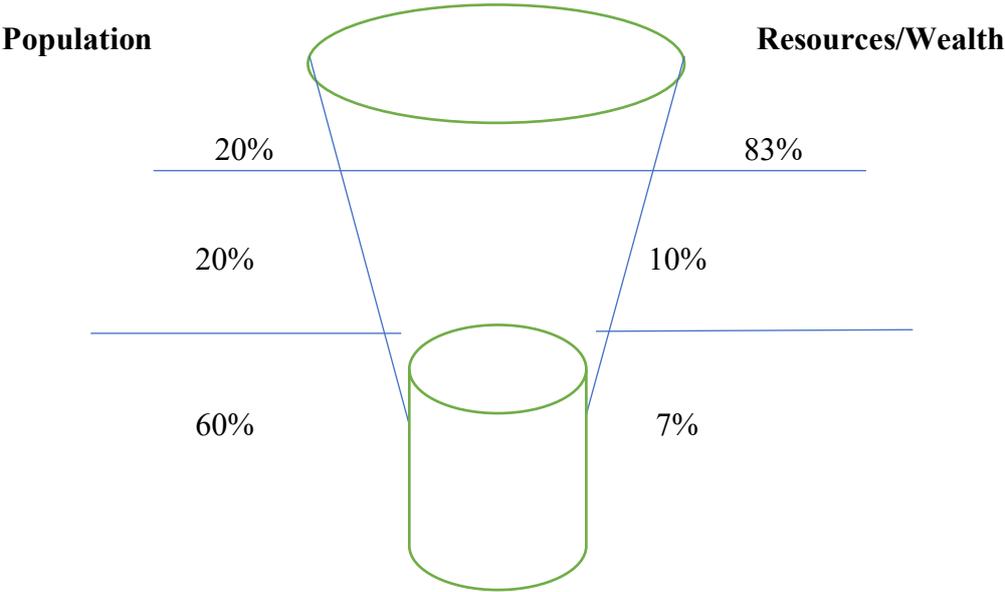
<sup>167</sup> Ibid., pp. 54-55.

<sup>168</sup> Ibid., pp. 54-55.

8.9.6 THE ECO-UNSUSTAINABLE “CHAMPAGNE GLASS” ECONOMY MODEL

This reflects a profoundly unjust distribution of resources worldwide. Approximately 20% of the world’s population controls around 83% of global wealth and resources, while another 20% accounts for only about 10%. The remaining 60% of the global population has access to only 7% of available resources, including human, technological, natural, and related assets.

**The Champagne Glass Model of the World Economy**



Source: Justice, Peace, and Creation Commission (WCC 2005:10)

# CHAPTER NINE: SUSTAINABLE DEVELOPMENT GOAL 13, CLIMATE JUSTICE, AND HIGHER EDUCATION: A TANZANIAN PERSPECTIVE

## 9 INTRODUCTION

### 9.1 PREAMBLE

This refers to a collective global endeavour to curb the multiple, long-term, drastic effects of climate change and global warming. It has recently been argued that “greenhouse gas emissions are more than 50 per cent higher than in 1990. Global warming is causing long-lasting changes to our climate system, which threatens irreversible consequences if we do not act.”<sup>169</sup>

Furthermore, from socio-economic, geographic, physical, and environmental perspectives, it has been estimated that the “annual average economic losses from climate-related disasters are in the hundreds of billions of dollars. This is not to mention the human impact of geo-physical disasters, which are 91 per cent climate-related and which between 1998 and 2017 killed 1.3 million people, and left 4.4 billion injured...”<sup>170</sup> Briefly, climate action is a *sine qua non* for comprehensive and visionary engagement for the good of the planet, humanity, soil flora, and soil fauna for thousands of generations to come. Africa remains the most affected continent.

### 9.2 JUSTIFICATION

Fundamentally, the 2030 Global Agenda for Sustainable Development, encapsulated in the 17 Sustainable Development Goals (SDGs), establishes a powerful framework for a revolutionary global lifestyle and for communities locally and globally. This book chapter has a threefold purpose. First, it re-makes a critical assessment of Sustainable Development Goal 13 (climate action) towards the true realisation of sustainable development, particularly the contribution of African higher education, both pedagogically and practically. Second, it underscores the multidisciplinary and interdisciplinary dimensions and functions of all the SDGs, especially in providing fundamental principles, strategies, policies, values, and motivation as global “game changers” and breakthroughs for sustainable, long-term climate justice, anthropogenic sinks,

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<sup>169</sup> [www.africa.undp.org](http://www.africa.undp.org) searched on the 25<sup>th</sup> March, 2025.

<sup>170</sup> Ibid.

and peaceful, sustainable living. Nonetheless, it identifies the inherent “*lacunae*” limitations and challenges as a whole. Third, from more transformative, methodological, and practical perspectives, today’s African model of higher education, in particular, needs to truly demonstrate results-based, innovative, creative, and interdisciplinary contributions, solutions, and alternatives towards the global realisation of the SDGs by 2030. Hence, avoiding only the North Atlantic and American-based solutions and models. Consequently, going beyond the business-as-usual approaches and dangerous inaction nationally and continentally.

Admittedly, today, the effects of climate change and human inaction are reaching catastrophic proportions. The 17 SDGs, and specifically SDG 13 on climate action, provide a vibrant and outstanding roadmap for the sustainability of all forms of life across short-, medium-, and long-term scenarios. As Archbishop Desmond Tutu once commented, “We do not have planet B. We have only one planet!!!” Climate action necessarily demands this triad: collective awareness, collective responsibility, and collective achievement.

To achieve sustainable African societies, African higher education, in particular, needs to reassess current climate studies and practices, educational models, policing action plans, and strategies. These must be demonstrated through the learning process, research on fitness and relevance, and community service to achieve “Cradle-to-Cradle” livelihoods and sustainable eco-communities and states in Africa.

First, SDG 13 underscores the universal responsibility to take innovative, transformative action for climate justice and sustainability.

Admittedly, SDG 13 and the other 16 SDGs are profoundly interconnected. That is, they support one another for a better planet and sustainable human and non-human livelihoods.

Consequently, a critical post-mortem of prevailing climate inaction, systemic injustices, and widespread indifference—both quantitative and qualitative—at the local and global levels is urgently required. This calls for a thorough reassessment of existing eco-education models, research agendas, and practical approaches to advance more sustainable, inclusive, and credible ecological solutions and alternatives, particularly in Africa and, more broadly, worldwide. At a minimum, this must encompass the development of a wide range of “smarter” eco-curricula, research frameworks, ecosystem services, and strategic interventions.

The African College of Wildlife Management in Mweka on the slopes of Mt. Kilimanjaro in Tanzania is a case in point.

### 9.3 SOME THOUGHT-PROVOKING QUESTIONS

The following interrelated questions guide this study:

1. Interlinkages among the SDGs
  - What are the intrinsic interconnections among all 17 Sustainable Development Goals (SDGs)?
  - How does SDG 13 (climate action) contribute to the realisation of other SDGs, both directly and indirectly?
  - What are the risks and consequences of treating the SDGs in isolation rather than as an integrated framework?
2. SDG 13 and African higher education
  - To what extent has the African College of Wildlife Management, Mweka, domesticated SDG 13 in its teaching, research, and community engagement activities?
  - More broadly, how have institutions of higher learning in Africa—particularly in Tanzania—integrated the relevance and urgency of SDG 13 into their daily pedagogical, research, and outreach practices?
3. Impacts of climate inaction
  - What are the socio-human, ecological, and economic costs of inadequate, ineffective, or delayed responses to climate change and global warming at present?
4. Institutional strengths, gaps, and challenges
  - What are the key strengths, gaps (*lacunae*), opportunities, and challenges within African higher education in advancing SDG 13?
  - Which concrete policies, action plans, and strategic models are currently being implemented on the ground?

5. Capacity-building and graduate preparedness
  - How are students and alums being prepared for personal, professional, and community-based climate action?
  - What eco-friendly energy sources and sustainability practices are currently being adopted by African higher learning institutions?
  
6. Knowledge systems and interdisciplinarity
  - To what extent do African universities draw on Afro-centric ecological visions, indigenous knowledge systems, and context-specific climate solutions?
  - What are the negative consequences of dissociating climate action education from other academic disciplines?
  - To what extent have departmentalism and compartmentalisation constrained African higher education?
  
7. Governance, policy coherence, and ethics
  - Is there effective coordination and shared vision between Ministries responsible for higher education and those responsible for environment and climate governance in Africa?
  - Do governments and policymakers adequately recognise the nexus between climate action, environmental ethics, climate justice, international law, and national governance frameworks?
  
8. Resistance and scepticism
  - What impact do climate change scepticism and denial have within African higher education institutions, and how do these dynamics affect climate education, research, and action?

#### **9.4 ECO-JUSTICE IN ISLAM**

The core functions of higher education are embodied in the perennial quest to generate relevant knowledge, conduct research, and transform communities. These fundamental roles are essential to sustainable development across cognition, the environment, socio-economics, technology, and related areas.

Bangay and Blum (2010), in their critical analysis of the origins and functions of the concept of Education for Sustainable Development (ESD), argue that ESD emerged in the late 1980s

alongside growing international debates on environmental protection and sustainable development. They note that the concept gained much of its conceptual shape at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992, particularly through the adoption of Agenda 21:

*“Education including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues, while basic education provides the underpinning of any environmental and development education, the latter need to be incorporated as an essential part of learning (UNCED 1992: Section 36.3)”*.<sup>171</sup>

Briefly, since then, Education for Sustainable Development (ESD) has received increasing global attention in higher education, particularly through the UNESCO-led United Nations Decade of Education for Sustainable Development (2005–2014). This educational model is designed to foster sustainable development by integrating multiple learning domains, including cognitive, psychomotor, attitudinal, and value-based dimensions.

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<sup>171</sup> Bangay, C. and Blum, N. “Education Responses to Climate Change and Quality: Two Parts of the Same Agenda?” *International Journal of Educational Development* 2010, 3014, 335-450.

Learning Capabilities for the 21 <sup>st</sup> Century	
Knowledge	The basic learning content includes core subjects, international language skills, broad-based scientific literacy, and self-knowledge.
Competencies and skills	These include foundational skills (literacy, oral expression, numeracy); critical thinking and problem solving skills (reasoning, recognising and questioning patterns; dealing with uncertainties; analysing, synthesising and evaluating information); planning and management skills; life-long learning skills (learn how to learn, to adapt knowledge to new contexts and to engage in self-directed learning); cross-cultural communication skills (ability to communicate in different cultural contexts, negotiate and resolve conflicts); and information, media and technology skills.
Attitudes and behaviours	Flexibility and adaptability; risk-taking; the willingness to take initiative; motivation; respect for self and others; sense of commitment; empathy; responsibility for one's actions and work.
Values	Solidarity; gender equality; tolerance; respect for difference; mutual understanding; respect for human rights; non-violence; respect for human life; and dignity.

*[Source: Haichour, Metzger, and Pigozzi (2007)]*

Lastly, it must be noted that a true and credible action education model for sustainability necessarily demands a profoundly transformative approach that respects and promotes a better quality of life and dignity, especially for long-term goals. Indeed, the Sustainable Development Goals embody a plurality of interconnected and interdependent socio-economic, environmental, cultural, legal, ethical, spiritual, political, and technological trajectories and ramifications.

#### **9.5 TANZANIA AND THE SUSTAINABLE DEVELOPMENT GOALS**

First, from a positive viewpoint, it has been indicated that Tanzania has made substantial “significant changes over the past century: poverty rates have been reduced, economic growth has been documented...”<sup>172</sup> Negatively, it has been observed that “public debt remains high, and estimates suggest risks to fiscal stability need to be acted on. No districts currently have disaster risk reduction strategies in place...”<sup>173</sup> These elucidate some fundamental systemic national strengths and weaknesses, particularly in the context of the SDGs.

#### **9.6 TANZANIA AND CLIMATE CHANGE TRENDS: INCONVENIENT TRUTHS AND FACTS**

First, recent research by the Climate Systems Analysis Group at the University of Cape Town indicates that Tanzania’s coastal climate is generally warm and wet. Dar es Salaam, for example, receives a mean annual rainfall exceeding 1,000 mm, with daily maximum temperatures ranging from 27 °C to 31 °C. Mwanza, located along the shores of Lake Victoria, receives approximately 700 mm of rainfall annually—higher than that of Tabora—largely attributable to the lake’s moisture influence. Nationally, Tanzania’s average annual temperature has increased by approximately 1.0 °C since 1960, with night-time temperatures rising more markedly than daytime temperatures. At the same time, observed declines in rainfall have been significant, with average annual rainfall decreasing by about 2.8 mm per month per decade since 1960.<sup>174</sup>

Second, projections of Tanzania’s future climate scenarios indicate that average annual temperatures are expected to increase by approximately 1.0–2.7 °C by the 2060s and 1.5–4.5 °C by the 2090s. Hot days and nights are projected to become increasingly frequent. Most parts of the country—particularly the semi-arid central and northern zones—are already highly vulnerable to climate variability and are expected to face heightened risks as the frequency and intensity of extreme climate events increase.<sup>175</sup>

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<sup>172</sup> Ifakara Health Institute: Tanzania and the Sustainable Development Goals: Has Tanzania Prepared to Roll Out and Domesticize the Health SDGs? See 3.0 National Context about SDGs, 09/01/2017.

<sup>173</sup> Ibid.

<sup>174</sup> Tanzania Climate Action Report For 2016: Resilience and Economic Inclusion Team/Irish Aid/November, 2017, p. 6.

<sup>175</sup> Ibid., pp 6-7.

Third, from a multisectoral perspective, Tanzania is expected to experience increasingly prolonged dry spells and more unpredictable rainfall patterns. These climatic shifts are likely to have far-reaching nutritional and public health consequences, including heightened food insecurity, increased malnutrition, weakened immune systems, and a greater prevalence of opportunistic diseases.<sup>176</sup>

Economically, recent assessments of the impacts of climate change estimate that building adaptive capacity and strengthening resilience in Tanzania will require annual investments of approximately USD 100–150 million—and likely more—to address existing climate risks, reduce future impacts, and enhance long-term resilience. The report further indicates that aggregate economic models project net economic losses of 1–2% of GDP per year by 2030 if climate risks are not adequately addressed.<sup>177</sup>

## ***9.7 AFRICA'S HIGHER EDUCATION AND SDG 13: A BROAD-SPECTRUM CRITICAL OVERVIEW***

### ***9.7.1 CURRICULA-BASED EXCELLENCE***

In recent years, African institutions of higher learning have shown a marked increase in attention to climate resilience-related knowledge and skills. This shift—evident in both qualitative and quantitative approaches to teaching, research, and engagement—is increasingly reflected in the mission, vision, and core value statements of many universities. Contemporary higher education is therefore no longer confined to the production and transmission of knowledge; it is increasingly oriented towards protecting the natural environment through the development of climate action competencies, applied research, and the delivery of concrete ecological solutions and services.

Second, McCowan (2019) unpacks two critical trajectories concerning the foundational role of African higher education in achieving the Sustainable Development Goals (SDGs). He highlights the projective and expansive roles of higher education, as well as five key modalities through which universities contribute to sustainable development: education, knowledge production, public debate, service delivery, and embodiment. These emerging conceptual frameworks are further developed and applied in the context of climate change, underscoring the transformative potential of higher education to advance climate action.<sup>178</sup>

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<sup>176</sup> Ibid., p. 8.

<sup>177</sup> Ibid., p. 8.

<sup>178</sup> Tristan McCowan Centre for Global Higher Education, Working Paper No.55. November Oxford University, 2020 p. 7.

### 9.7.2 RESEARCH-BASED EXCELLENCE

First, recent research from Africa's higher education sector highlights the catastrophic impacts of greenhouse gas (GHG) emissions, particularly in the livestock sector. The evidence indicates that livestock supply chains generate approximately 7.1 gigatonnes of CO<sub>2</sub>-equivalent emissions annually, accounting for about 14.5% of total anthropogenic emissions worldwide. Cattle are responsible for the largest share of these emissions (approximately 65%), followed by pigs, buffalo, and chickens. In addition, an estimated 2.1 million hectares of deforestation have been directly linked to cattle production, underscoring the sector's significant contribution to climate change and environmental degradation.<sup>179</sup>

Third, recent evidence indicates that climate-related symposia, student clubs, workshops, and awareness campaigns make a significant contribution to climate resilience education within Africa's higher education sector. A chi-square test of independence indicates that student participation in climate change workshops or programmes has a statistically significant effect on both their knowledge of climate change and their confidence in educating others about it ( $\chi^2 = 9.507, p = 0.002$ ).<sup>180</sup>

### 9.7.3 ETHICS AND VALUES-BASED EXCELLENCE AND FITNESS

First, Msafiri (2013: 661) articulates an eco-ethical framework that foregrounds an increasingly important nexus between climate justice and sustainability. He emphasises the need for value-based and qualitative approaches to addressing climate challenges, arguing that prevailing quantitative, functionalist, and legalist responses are neither exhaustive nor sustainable. In this regard, Msafiri contends that the current global situation demands a radical shift towards viable, sustainable ethical frameworks for climate rights, without which neither humanity nor the Earth can endure.<sup>181</sup>

Second, among others, the eco-corpus vision and transformative engine of Msafiri succinctly encapsulate the following trajectories, principles, and strategies in particular:<sup>182</sup>

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<sup>179</sup> Cfr. [www.mdpi.com/journal/environments](http://www.mdpi.com/journal/environments) Mark M. Akrofi Sarpong H *et al.* 'Students in Climate Action: A Study of Some Influential Factors and Implications of Knowledge Gaps in Africa', p. 8.

<sup>180</sup> *Ibid.*, p. 11.

<sup>181</sup> Aidan G. Msafiri "Ethics for Climate Justice and Sustainability through Value-based Approaches: A New Tanzania Model and Paradigm Shift" in Oliver C. Ruppel, Christian Roschmann *et al.* *Climate Change: International Law and Global Governance* Vol. II Baden, Nomos, 2013, p. 661.

<sup>182</sup> *Ibid.*, pp. 675 *passim*.

a) *The Principle of Integral (Holistic) Climate Care and Compassion.*<sup>183</sup>

Today, there is a growing positive attitude, both individual and collective, particularly in promoting a “non-business as usual” culture and virtues towards the planet and climate challenges.

b) *The Principle of Globalisation of Climate Action Concern.*<sup>184</sup>

This unleashes a powerful new climate action ethos reinvigorating both profound pro-activeness on personal and collective awareness and action in protecting the climate, the “DNA” and “health” of climate and environment, in short, medium, and long-term trajectories. It underpins the key triad of efficiency, fairness, and sustainability.

c) *The Principle of Interdisciplinary on Climate Change Science(s).*<sup>185</sup>

This underpins the fundamental interdependencies among climate, climate science, the natural sciences, and the social sciences in the collaborative quest to preserve the climate and environment locally and globally. Hence, avoiding the “cancers” of departmentalism and “myopism” as a whole.

d) *The Precautionary Principle on Climate Disasters:*

This principle underscores and demands personal and collective consciousness, and a mindful stance on climate justice, action, and the regimes and goods for thousands and thousands of years to come.

e) *The Principle of Human Capital<sup>186</sup> and Fitness in Climate Action:*

It strongly emphasises the urgent need for rigorous human capacity building in, for, and with higher education in Africa today. These include transformative core skills, competencies, visions, and aptitudes for climate resilience and sustainability.

f) *The Principle of AGAPE (Golden Rule) in Climate Action:*

This is embodied in all great religions as the most fundamental solution to climate action for people worldwide (Mt. 22:37-39). This includes the fundamental human rights to adequate

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<sup>183</sup> Ibid., pp. 675-676.

<sup>184</sup> Ibid., p. 676.

<sup>185</sup> Aidan G. Msafiri “Good Governance and Sustainable Management of Natural Resources”, in KAS-Journal Volume II, March 2013 p. 45.

<sup>186</sup> Ibid., p. 48.

shelter, food, good hygiene, and education. On the one hand, it also includes those of plants (soil flora) and animals (soil fauna) as a whole. Hence, promoting the fundamental ethical norms and values of dignity, the preservation of life, trust, partnership, integrity, sustainability, inclusivity, and solidarity, both vertically and horizontally.

g) *The Principle of Deep Change and The Middle Path for Climate Action:*

It addresses today's climate challenges and issues through more qualitative and plausible trajectories. Admittedly, a deep change model complements mere arithmetic, geometric, and calculus-based models and solutions. These are *ipso facto* complementary. In this regard, therefore, Sachs (2011:162) strongly comments that the “essential teaching of both Buddha and Anstotle is the path of moderation pursued through life-long diligence, training and reflection. It is easy to become addicted to hyper consumerism, the search for sensory pleasures and the indulgence of self-interest, leading to a brief but long-term unhappiness...”<sup>187</sup> This principle emphasises motivation for higher and nobler goals.

#### 9.7.4 JUSTICE-BASED EXCELLENCE AND COMPREHENSIVE MODEL<sup>188</sup>

First, justice necessarily calls for a new and vibrant culture of capacity for climate action, grounded in knowledge, skills, and aptitudes.

Second, comprehensive justice in climate action demands fair participation by all peoples, stakeholders, and players in society, starting from the Bottom of the Pyramid (BOP).

Third, justice in and for climate change entails the collective affirmation and protection of climate justice. This includes, among others, respect for and protection of environmental and human rights; the right to development; the rights to gender equity and equality; recognition of the transformative potential of climate sustainability; and the right to effective and meaningful action through global climate partnerships.

Fourth, true justice in and for climate resources demands transparent and democratic procedures, systems, and strategies among all stakeholders, e.g., local communities, NGOs, government, academia, and businesses.

Fifth, integral justice demands not only the fair and equal distribution of ecological benefits and resources but also the due punishment of individuals, businesses, institutions, governments, and

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<sup>187</sup> Jeffrey D. Sachs, “The Price of Civilization: Economics and Ethics After the Fall.” London, The Bodley Head, 2011, p. 162.

<sup>188</sup> Aidan G. Msafiri, “Good Governance and Sustainable Management of Natural Resources” in KAS Journal pp. 48-50 passim.

companies that are directly or indirectly involved in eco-destruction and the loss of biodiversity and resources.

Last but not least, comprehensive justice requires diligent respect for the rights of future generations—both human and non-human—and for the long-term ecological integrity, well-being, and flourishing of life on Earth.

#### 9.7.5 POLICY-BASED EXCELLENCE AND KEY TENETS

First, a new synergistic, policy-oriented, and interdisciplinary approach—particularly within higher education institutions—underpins the East African Climate Policy (2011), notably Section 3.1.3.3, as well as related policy instruments more broadly.<sup>189</sup> This section underscores the key nexus between the East African Community Framework and other multi-sectoral policies, including water resources, coastal and marine environment, forestry, wildlife management, agriculture and food security, human health, tourism, energy, infrastructure, land use, human settlements, fisheries, livestock, and industry.

Since 2015, Tanzania has placed greater emphasis on aligning climate change mitigation and adaptation with its national development priorities. Policy documents affirm that both greenhouse gas mitigation and climate change adaptation are systematically addressed within the national policy framework. The central institutional focal point for climate governance is the Division of Environment in the Vice President’s Office, a key authority that reports directly to the Vice President. The Vice President’s Office coordinates national climate policy and oversees Tanzania’s international climate engagements, including responsibility for formulating and implementing the country’s Nationally Determined Contribution (NDC).<sup>190</sup>

Briefly, from a higher education perspective, this policy is structured around several key pillars that are particularly relevant to teaching, research, capacity-building, and community engagement:

- a) The need to adopt a narrative of “green growth”, “Cradle-to-Cradle growth” as a more effective, resilient, and efficient way towards climate action at all educational and sectoral levels.

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<sup>189</sup> Konrad Adenauer Stiftung (KAS) The Challenges of Climate Change Adaptation and the Potential of Sustainable Energies in the East African Community (EAC) After COP 19 Dar es Salaam, KAS 2014 pp. 44-45.

<sup>190</sup> Grantham Research Institute on Climate Change and the Environmental Centre for Climate Change Economics and Policy, Policy Briefs by Michal Nachmany, October 2018, pp. 3-4.

- b) Tanzania's higher education is more focused on interdisciplinary and inter-sectoral approaches, especially in addressing climate change challenges at different workshops, symposia, conferences, etc.
- c) A growing sense of putting greater and unique importance at the local levels (Bottom of the Pyramid) than ever before.
- d) Fourth, recent (2021) observation among higher education institutes portrays a powerful propensity, especially emphasising the accessibility<sup>191</sup> to the use of transformative climate action research gaps, challenges, and opportunities.
- e) Lastly, particularly in the post-COP 21 period following the 2015 Paris Agreement, there has been a marked and unprecedented emphasis on eco-jurisprudence within higher education. This new trend is characterised, among others, especially by the new principles of “Common but Differentiated Responsibilities” (CBDR),<sup>192</sup> the “Nationality Determined Contributions” (NDC), environmental law regimes, customary international law, and climate action.

#### 9.7.6 TECHNICAL-BASED EXCELLENCE

First, from a research perspective, the Institute of Rural Development Planning (IRDP) in Dodoma, Tanzania, demonstrates a strong multidisciplinary approach and recognised expertise in climate action and sustainability. This is reflected in its research activities, publications, and consultancy services, particularly in sustainable agriculture, environmental management, livestock systems, food security, and governance. Currently, IRDP is leading an eco-village adaptation model project to address climate change challenges in central Tanzania, with financial support from the European Union.<sup>193</sup> The primary objective of this initiative is to strengthen climate change resilience among rural households in Chamwino District and Dodoma City, through collaborative engagement with key local and national stakeholders. These include the Chamwino District Council, Dodoma City Council, the Hombolo Agricultural Research Centre, the Dodoma Environmental Network (DONEI), Maji na Maendeleo Dodoma (MAMODO), and the Tanzania Organic Agriculture Movement (TOAM).<sup>194</sup>

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<sup>191</sup> Ibid., pp. 7-8.

<sup>192</sup> Aidan G. Msafiri in Konrad Adenauer Stiftung, Supporting the Rule of Law in Africa “Climate Change and Law”, Nairobi, KAS 2017 pp. 110-112 passim.

<sup>193</sup> [https://www.irdp.ac.tz/research/about department](https://www.irdp.ac.tz/research/about%20department) searched on the 22nd April, 2025.

<sup>194</sup> Ibid.

Second, in recent years, a range of agreements, contracts, and partnerships have been established to advance climate action, environmental protection, and sustainability, particularly involving the Tanzanian government, academic institutions, non-governmental organisations, line ministries, and Norway. Notable examples include the National Carbon Monitoring Centre, hosted at the Sokoine University of Agriculture, and Tanzania's engagement with REDD+ financing mechanisms.

These partnerships also seek to enhance institutional capacity among key actors, including the Forest Training Institute, the Vice President's Office REDD+ Readiness Programme, the Conservation and Restoration of the Eastern Arc Mountains Project (CREAM), and the Agricultural Council of Tanzania, among others.<sup>195</sup>

Last but not least, from a technical perspective, the Nelson Mandela University of Science and Technology in Arusha, Tanzania, has recently made substantial efforts, particularly in climate action projects, with very promising, measurable contributions. Among others, these include:

- a) The Water Infrastructure and Sustainable Energy Futures (WISE FUTURES).
- b) The Evaluation Project of the Suitability of Water Hyacinth from Lake Victoria as a feedstock for Biofuel Production.
- c) BIOINNOVATE Project for agro/biowaste conversion in Eastern Africa.
- d) The Solar-assisted Heat Pump Drying Technology for Tanzania's Industrial and Agricultural Use.
- e) The Social Science of Climate Change Adaptation in advancing academic writing for young academicians in Tanzania.<sup>196</sup> These initiatives represent a selection of best-practice endeavours that underscore Tanzania's academic contribution to SDG 13 (Climate Action) and to the SDGs more broadly. In particular, the Centre for Climate Change Studies and the College of African Wildlife Management at Mweka stand out as vibrant, rapidly expanding centres of excellence. Through climate-focused training, interdisciplinary research, and applied consultancy, these institutions are developing credible models for climate change mitigation and adaptation, strategic planning, and the implementation of climate action and eco-management projects in Tanzania. Collectively, they illustrate academia's growing

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<sup>195</sup> [www.norway.no/tanzania](http://www.norway.no/tanzania) searched on the 22nd April, 2025.

<sup>196</sup> [www.nm.aist.ac.tz](http://www.nm.aist.ac.tz) searched on the 22nd April, 2025.

and substantive role in advancing climate governance and sustainable development in the country.

#### 9.7.7 AN AFRO-BASED HOLISTIC MODEL AND ITS EXCELLENCE

First, Msafiri (2016:29) aptly underpins this integral model, particularly through Afro-centric eco- and climate-based life news. These depict God (“Ruwa”) as the creator and “Homo Africanus” as responsible co-creators, stewards, and protectors of the created world, including all climate-related resources: land, atmosphere, minerals, air, soil flora (plants), and soil fauna.<sup>197</sup>

Second, unlike the Euro-American, North Atlantic quantitative, and mathematically based approaches, which are profoundly dualistic, atomistic, and individualistic, the Afro-centric model is necessarily and essentially qualitative, all-encompassing, and life-enhancing. Briefly, it systematically and integratively incorporates a plethora of life-promoting values, worldviews, and traditions. It underpins the inclusive African spiritual, anthropological, and cosmological altruism of ‘*I am because we are*’ as advocated by John S. Mbiti. According to Mbiti, land or nature in the broadest sense of the word is not an empty impersonal object or phenomenon; it is filled with religious significance. For African people, a religious universe is not an academic proposition; it is an empirical experience that reaches its height in acts of worship.<sup>198</sup> In the same vein, Msafiri’s recent book (2019:1-101) presents a profoundly Afrocentric climate change framework and model grounded in the dynamics of interconnectedness, interdisciplinarity, and interdependence, both horizontally and vertically.<sup>199</sup>

### 9.8 SOME GAPS AND DISCONNECTS: A CRITICAL CRITIQUE

#### 9.8.1 CURRICULA AND PEDAGOGICAL GAPS

First, there is a critical lack of curricula in higher education that are adequate, relevant, practical, and action-oriented on climate action. Unfortunately, knowledge about climate action is at times considered a mere intellectual luxury or a merely essay-based pathway to earn good credits.<sup>200</sup>

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<sup>197</sup> Aidan G. Msafiri, *Globalisation of Concern III: Essays on Climate Justice, Education, Sustainability and Technology*, Geneva, Globethics.net Focus No. 32, p. 29.

<sup>198</sup> John S. Mbiti, *African Religious and Philosophy*, New York: Doubleday, 1970, pp. 73-74.

<sup>199</sup> Aidan G. Msafiri, *Globalization of Concern: How Relevant and Timely is “Laudato Si” for Africa* Wienerwald, Be & Be 2019 pp. 1-101 passim.

<sup>200</sup> Aidan G. Msafiri, *Globalization of Concern II*, (Geneva: Globethics.net No. 8) p. 41.

Second, there is an ever-growing negative trend, particularly among scholars in Africa's higher education, of treating climate action, education, and skills as the domain of a select cadre of experts and climate "gurus". The majority at the Bottom of the Pyramid are left aside. This attitude and practice discourage interdisciplinary and interdepartmental approaches and methodologies for effectively addressing climate challenges. Hence, it gives rise to unhealthy departmentalism and the compartmentalisation of climate knowledge, both in terms of content and methods.<sup>201</sup>

#### 9.8.2 COMMERCIALISATION AND COMMODIFICATION OF CLIMATE-RELATED INSTITUTIONS

First, some universities and other higher education institutions addressing climate issues locally and globally have been placing greater emphasis on profitability than on results-based climate action and sustainability.

Second, in many cases, climate change and climate action symposia at conferences simply take place among higher-education scholars and academic gurus, in luxurious hotels, on beaches, in resorts, and in halls far from the millions of climate victims at the Bottom of the Pyramid.

#### 9.8.3 IDEOLOGICAL–PHILOSOPHICAL GAPS

First, there are four radical or extremist philosophical and ideological worldviews, as well as life views on climate and the environment. This is made of the following four models:

The extreme anthropocentric life view, which considers the human person the centre of everything; the biocentric life view, which considers the lives of plants and animals essential; and the cosmo-centric life view, which upholds only the rights of the physical world at the expense of humans and other life forms. Lastly, the pathocentric worldview exaggerates the rights and roles of animals at the expense of those of humans, plants, and creation.<sup>202</sup>

#### 9.8.4 JURISPRUDENTIAL AND POLICY GAPS

First, these are embedded in metaphorical models that fail to respond to climate justice and action. The 'Greedy Jackal' climate action and Sustainability Policy Model, the 'Ignorant Ostrich' climate action model, the 'Business as Usual' climate action model, the 'Busy Bee' climate action model, and the 'Chameleon' climate action model.<sup>203</sup>

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<sup>201</sup> Ibid., p. 41.

<sup>202</sup> Aidan G. Msafiri in Oliver C. Ruppel and Christian Roschmann Vol. I pp. 669-670.

<sup>203</sup> Aidan G. Msafiri in KAS "Supporting the Rule of Law in Africa" p. 111.

Second, there is a significant gap in coherence and continuity, particularly across the institutional, national (Tanzania's), and regional climate change strategies and policies. Furthermore, from a gender perspective, observation indicates that many climate action-based policies do not adequately address gender related issues for gender equality, inclusivity, and equity. Hence, making a larger percentage of women become climate change victims, refugees, and sufferers.

Third, there remains a widespread and persistent deficit in core knowledge, skills, competencies, and motivation across Africa's higher education sector, particularly regarding the principle of Common But Differentiated Responsibilities (CBDR), climate justice, REDD+, and the Clean Development Mechanism (CDM), among others. In practice, it is therefore not surprising to observe—even daily—that highly educated professionals, staff, students, and academics continue to aspire to carbon-intensive lifestyles, characterised by excessive private car use, high consumption of plastic products, meat-heavy diets, and the proliferation of multiple digital devices. At both institutional and national levels, these behavioural patterns are compounded by organisational capacity constraints, systemic inefficiencies, and outdated climate-related laws and policies, which together directly or indirectly intensify ecological degradation and climate stress, with long-term consequences for the planet and future generations.

#### 9.8.5 NEGATIVE EFFECTS OF THE HIGH-SPEED MANIA IN HIGHER EDUCATION

First, Msafiri (2013: 673) reflects on the contemporary postmodern tendency towards a high-speed culture and its detrimental consequences for the climate and the environment, particularly within higher education. In this context, speed is valorised as a virtue, while slowness is framed as a vice. Such a “high-speed” culture not only accelerates the consumption of energy and non-renewable resources but also increases greenhouse gas emissions from transport, industry, and aviation, among other sources.<sup>204</sup>

Second, Philip Vinod Peacock, citing Jeremy Geedom, argues that the car has become emblematic of a human enterprise that is contributing to the extinction of countless species. While scientists warn that biological diversity is declining at an alarming rate, Peacock observes that an artificial diversity of machines continues to proliferate, as humans increasingly populate the world with entities of their own technological invention.<sup>205</sup>

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<sup>204</sup> Aidan G. Msafiri, in Oliver C. Ruppel, p. 673.

<sup>205</sup> Philip V. Peacock, *Challenging the Idols of Speed*, in *World Common of Reformed Churches* (Geneva, 2011).

Briefly, all these gaps (“*lacunae*”), discrepancies, limitations, or disconnects elucidate systemic weaknesses, particularly inherent in the current higher education edifice on climate change in Tanzania and, more broadly, in Africa.

**9.9 THE MWEKA COLLEGE AND ITS CONTRIBUTIONS TO SDG 13: BEST PRACTICE**

9.9.1 CURRICULAR EXCELLENCE

First, the College of African Wildlife Management, Mweka, as a leading institution in competence-based professional and technical training in wildlife and tourism management, makes a substantial contribution to SDG 13 (climate action). This contribution is reflected in its vision to become a centre of excellence for professional and technical training that responds to the challenges of wildlife sustainability and biodiversity conservation in Africa. Its mission further commits the institution to delivering the highest standards of technical training by engaging with the global community and academia in research and consultancy activities to address the evolving needs of wildlife and tourism management across the continent.<sup>206</sup>

Second, the College of African Wildlife Management, Mweka, offers specialised modules in Habitat Management and Project Planning and Management. Among their core objectives, these modules critically examine the National Climate Policy in relation to conservation, the role of international organisations in climate change mitigation, and the relevance of renewable energy in environmental and wildlife management contexts, among other key thematic areas.

[College of African Wildlife Management, Mweka, Since 1963]



(Source: [www.mwekawildlife.ac.tz](http://www.mwekawildlife.ac.tz))

<sup>206</sup> Cfr - College of African Wildlife Management Brochure under the vision and mission statements April 2021.

#### 9.9.2 PROGRAMME EXCELLENCE

Competence-based climate action modules are offered both at the diploma and bachelor's degree levels in Wildlife Management programs. These are:

- a) Postgraduate Diploma in Wildlife Management;
- b) Postgraduate Diploma in Tourism Planning and Management;
- c) Bachelor's Degree in Wildlife Tourism (NTA 7&8);
- d) Ordinary Diploma in Wildlife Management (NTA 6);
- e) Ordinary Diploma in Wildlife Tourism (NTA 6);
- f) Technician Certificate in Wildlife Management (NTA 5);
- g) Technician Certificate in Wildlife Tourism (NTA 5);
- h) Basic Technician Certificate in Wildlife Tourism (NTA 4); and
- i) Basic Technician Certificate in Wildlife Tourism (NTA 4).

Some short courses offered by the College: -

- a) Tour Guiding and Interpretation;
- b) Snake Capturing, Handling and Translocation;
- c) Professional Walking Safari;
- d) Applied Firearms;
- e) GIS for Conservation;
- f) Wildlife Inventory and Monitoring for Wildlife Management Areas;
- g) Natural Resource Entrepreneurship;
- h) Ecological Monitoring in Protected Areas;
- i) Natural Resource Policies and Procedures for Community-based Protected Areas;
- j) Conservation Action Planning and Finance Reporting;
- k) Destination Management;
- l) Monitoring and Evaluation for Wildlife Management Areas;
- m) Cultural Tourism Promotion and Management;
- n) Principles of Protected Areas Planning;
- o) Plant Identification and Herbarium Techniques;
- p) Birds Identification and Interpretation; and
- q) Governance in the Management of Natural Resources.

### 9.9.3 RESEARCH AND TECHNICAL EXCELLENCE

First, rigorous, policy-relevant research on climate action, biodiversity conservation, and eco-management constitutes the “heartbeat” of the College of African Wildlife Management's research agenda at Mweka. A notable example of best practice is the institution’s ongoing collaborative research on climate change perceptions and adaptation strategies in Tanzania, which seeks to inform evidence-based policy, community resilience, and sustainable wildlife management.

Second, the Kwakuchinja Wildlife Corridor (KWC) serves as a flagship example of research best practice, particularly in reassessing wildlife well-being, movement patterns, and the long-term sustainability of biodiversity between Tarangire National Park and Lake Manyara National Park in Tanzania. This research employed open-source geospatial tools, notably Google Earth Engine and QGIS, to analyse land-use and land-cover change. The findings indicate that agricultural land use increased by 35.6% and woodland cover declined by 67.4% in the KWC study area between 2002 and 2017, underscoring significant pressures on ecological connectivity and biodiversity conservation.<sup>207</sup>

Third, among recent research publications linked to climate action, these two are worthy of mention:

- a) “Climate Controls of Decomposition Drive the Global Biogeography of Forest-trees Symbioses”, published in *Nature* by Steidinger, Martin *et al.*
- b) “Climate Land-Use-Interactions Shape Tropical Mountain Biodiversity and Ecosystem Functions”, published in *Nature* by Dulle *et al.*



(Source: [www.mwekawildlife.ac.tz](http://www.mwekawildlife.ac.tz))

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<sup>207</sup> Cfr. College of African Wildlife Management CAWN, Mweka, Research Abstracts 2019/2020 p. 9.

#### 9.9.4 PUBLICATIONS' EXCELLENCE

The College of African Wildlife Management, Mweka, has made a distinctive contribution to climate action through a broad portfolio of well-researched, high-quality, and policy-relevant publications. This scholarly output is produced through rigorous collaboration among college staff, students, and external experts, and is informed by research conducted at both national and international levels. Notably, during 2019–2020, the College published 26 peer-reviewed outputs on biodiversity conservation and climate change, underscoring its active role in advancing evidence-based climate governance and sustainability discourse. Among others, the following contributions<sup>208</sup> need special mention and attention as a whole:

- a) “The Coverage of Biodiversity Conservation Issues in Local Newspapers and the Role of Enhancing Conservation Awareness. An Analysis of Two News Outlets” (Jafari R. Kideghesho *et al.*).
- b) “Spatiotemporal Changes in Wildlife Habitat Quality in the Greater Serengeti Ecosystem” (Jafari R. Kideghesho *et al.*).
- c) “Climate Controls of Decomposition Drive the Global Biogeography of Forest-Tree Symbioses” (Emmanuel Martin *et al.*).
- d) “Ecosystem Services and Importance of Common Tree Species in Coffee-Agro Forestry Systems: Local Knowledge of Small-Scale Farmers at Mt. Kilimanjaro, Tanzania” (Rudolf Mremi *et al.*).
- e) “The Importance of Nutrient Hotspots Using Camera Traps, Indirect Observation and Stable Isotopes in A Miombo Ecosystem, Tanzania” (Gabriel Mayengo *et al.*).
- f) “Land Use and Land Cover Change Within and Around the Greater Serengeti Ecosystem, Tanzania” (Jafari R. Kideghesho *et al.*).
- g) “Climate-Land-Use Interactions Shape Tropical Mountain Biodiversity and Ecosystem Functions” (Hamadi).

#### 9.9.5 COMMUNITY OUTREACH AND RELEVANCE

First, the College of African Wildlife Management, Mweka, has introduced a climate action-oriented Bee Pollinator Project among neighbouring schools and local communities, aimed at enhancing biodiversity conservation, ecosystem services, and climate resilience through community-based engagement and environmental education.<sup>209</sup> Participating schools include

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<sup>208</sup> Ibid., pp. 3-32. For more information on publications see [www.mwekawildlife.ac.tz](http://www.mwekawildlife.ac.tz) under research and publications.

<sup>209</sup> Interview with Dr Emmanuel Martin 16<sup>th</sup> March, 2025.

Cyril Chami Secondary School, Maria Goretti Secondary School, Nsoo Secondary School, and Kibosho Girls Secondary School. This initiative contributes significantly to biodiversity conservation, provides opportunities for local economic benefits, and enhances climate awareness and climate action among learners and surrounding communities.

Second, from a national perspective, the College of African Wildlife Management, Mweka, has been actively engaged in national tree-planting initiatives and in promoting public education on climate change, the challenges of climate action,<sup>210</sup> and biodiversity conservation at the grassroots level. This outreach has been conducted through a range of media platforms, including Moshi FM, TBC1, Kili FM, Uhai TV, and the Safari Channel.

#### 9.9.6 PARTNERSHIP EXCELLENCE AND POTENTIALS

First, as a distinctive and highly regarded institution in African biodiversity conservation, the College of African Wildlife Management, Mweka, has established a wide range of national and international partnerships. These academic and research-based collaborations play a critical role in equipping the College's staff, students, and graduates with a global perspective on climate action, professional competence in biodiversity conservation, and a strong sense of environmental responsibility. Notable partnerships include collaborations with the University of Florence, the University of Freiburg, the University of Manchester, and the University of Milan, among others.

Second, Mweka College enjoys a strong reputation and high level of recognition, particularly among conservation organisations operating within Tanzania's national parks and mountain forest ecosystems. This standing reflects the College's long-standing contribution to professional training, applied research, and practical conservation outcomes at both national and regional levels.

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<sup>210</sup> Ibid.

# CHAPTER TEN: CLIMATE JUSTICE NEXUS AND THE CRADLE-TO-CRADLE REGENERATION NEW MODEL (LIFE VIEW)

## 10 INTRODUCTION

### 10.1 PREAMBLE

According to McDonough and Braungart (2002; 2009), the Cradle-to-Cradle eco-justice model represents a fundamentally new paradigm for the design and development of products and services. Rather than focusing on doing “less bad,” the model advocates a transformative shift towards doing “more good”, by designing systems that are regenerative by intention. Sustainability within this framework is understood as resting on three interdependent pillars: human well-being, economic vitality, and environmental integrity.<sup>211</sup> Briefly, this model re-emphasises that products should be designed and produced within a circular economy (CE) framework, in which materials are continuously reused, waste is eliminated by design, and toxic or harmful substances are progressively eradicated from production and consumption systems.

### 10.2 JUSTIFICATION

Among other considerations, the fundamental justifications for the Cradle-to-Cradle model are threefold. First, it promotes genuinely sustainable management by avoiding the negative impacts associated with linear industrial and manufacturing processes, thereby reducing waste trade-offs while maintaining the quality and value of materials throughout their life cycles. Second, as an eco-justice-oriented model and worldview, it emphasises protecting the planet’s resilience and safeguarding the integrity and quality of natural resources. In sum, Cradle-to-Cradle represents an innovative and ecologically grounded vision that advances alternative, sustainable pathways for climate action and eco-justice.

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<sup>211</sup> Haradhan Kumar Mohajan, “Cradle to Cradle is a Sustainable Economic Policy for Better Future” in *Annals of Spini Haret University, ICCS, Issue 4/2021* p. 1. Also see Michael Braungart, William McDonough, “Cradle to Cradle: Remaking the Way We Make Things”, London, Vintage Books, 2009, pp. 3-26 passim.

### 10.3 CLIMATE JUSTICE AND ECO-EFFECTIVENESS

The following principles embody these key elements and contours. First is the importance of long-term production mechanisms, methods, and strategies that prioritise durability, waste-free manufacturing, and planetary resilience. To illustrate this regenerative logic, Michael Braungart and William McDonough employ a powerful natural metaphor. They observe that a cherry tree, for example, “produces abundant blossoms and fruit without depleting its environment. When these fall to the ground, they decompose into nutrients that nourish microorganisms, insects, plants, animals, and the soil. In this way, the tree’s fecundity sustains and enriches the entire ecosystem around it.”<sup>212</sup> Contemporary megacities and human-built systems must therefore rethink their development trajectories through the lens of the cherry tree metaphor. Today’s seemingly limitless urban expansion, hyper-industrialisation, and addictive consumption patterns demand a fundamental re-evaluation. Growth pursued for its own sake—or merely as a means to an end—becomes, in effect, destructive and self-defeating. The critical logic is not to make human industries and systems smaller, as efficiency-centred approaches often suggest, but to design them to grow better: in ways that replenish, restore, and nourish the wider world. Accordingly, the “right” course for manufacturers and industrial actors is to pursue forms of growth that generate positive outcomes—creating more ecological niches, health, nourishment, diversity, intelligence, and abundance—for present inhabitants of the planet and for generations to come.<sup>213</sup>

### 10.4 CLIMATE JUSTICE THROUGH WASTE AS “FOOD”

Fundamentally, the cyclical Cradle to Cradle biological model aims to eliminate waste by enhancing biodiversity, ecosystems, eco-justice, naturalness, and resilience. Jacob Voorthuis and Cyrille Gijbels offer a particularly insightful analysis of waste as an ecological challenge rooted in hidden toxic additives. They argue that many everyday products contain substances that may be harmful when released into the environment. Items such as cuddly toys, wallpaper, and carpets are often not free of phthalates, which poses a significant challenge for recycling. While recycling is widely regarded as a cornerstone of contemporary sustainability strategies, recycling materials containing such additives can inadvertently release them into the environment, where they were never intended to be, thereby undermining ecological and human health objectives.<sup>214</sup> Second, Michael Braungart’s postulate that “waste equals food” is

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<sup>212</sup> Michael Braungart, William McDonough, “Cradle to Cradle” p. 73.

<sup>213</sup> *Ibid.*, p. 78.

<sup>214</sup> Jacob Voorthuis, Cyrille Gijbels “A Fair Accord: Cradle to Cradle as a Design Theory Measured Against John Rawls’ Theory of Justice and Immanuel Kant’s Categorical Imperative Sustainability”. 2010, pp. 2, 373.

grounded in the remarkable resilience and circularity of natural metabolic and nutritional systems among plants, animals, and humans. As Braungart and William McDonough explain, animals and humans continuously exhale carbon dioxide, which plants absorb and use in photosynthesis for growth. Nitrogen contained in waste streams is transformed into proteins by microorganisms, plants, and animals. Horses consume grass and produce dung, which in turn provides both habitat and nourishment for fly larvae. In this way, the Earth's primary nutrients—carbon, hydrogen, oxygen, and nitrogen—are continuously cycled and recycled within natural systems. From this perspective, waste is not an endpoint, but a resource: waste, quite literally, becomes food.<sup>215</sup> The concept and practice of “Waste Equals Food” necessarily demand that all products and industrial systems or processes be designed to enable the continuous flow of nutrients across biological and technical metabolisms as a whole. Hence, shifting from “Cradle-to-Grave” to “Cradle-to-Cradle” scenarios enhances resource efficiency, sustainability, resilience, and regeneration. According to Michael Braungart:

*“Nature operates according to a system of nutrients and metabolisms in which there is no such thing as waste. A cherry tree makes many blossoms and fruit to (perhaps) germinate and grow. That is why the tree blooms. But the extra blossoms are far from useless. They fall to the ground, decompose, feed various organisms and microorganisms, and enrich the soil. Around the world, animals and humans exhale carbon dioxide, which plants take in and use for their own growth. Nitrogen from wastes is transformed into protein by microorganisms, animals, and plants. Horses eat grass and produce dung, which provides both nest and nourishment for the larvae of flies... This cyclical, cradle-to-cradle biological system has nourished a planet of thriving, diverse abundance for millions of years.”*

#### **10.5 CLIMATE JUSTICE THROUGH RESPECT FOR DIVERSITY**

First, this encompasses a broad-spectrum concept of biological, socio-cultural, economic, and human aspects. Together, these processes form a complex tapestry of thriving life forms and communities, deeply interconnected and interdependent. The vitality and long-term sustainability of ecosystems depend fundamentally on relationships—on the interactions among species and their exchanges of materials and energy. Within such systems, diversity constitutes strength, whereas monoculture signals vulnerability. As ecological relationships are

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<sup>215</sup> Ibid., Michael Braungart, William McDonough “Cradle to Cradle”, p. 92.

progressively disrupted, ecosystems become less stable, less resilient to natural disturbances and disease, and less able to maintain health and adaptive capacity over time. By contrast, the greater the diversity within an ecosystem, the more robust and productive its functions are for the planet as a whole.<sup>216</sup> This should encompass the “localisation” of sustainability culture and actions, particularly through the use of local materials, energy flows, and diversification of alternative and renewable energy sources. Hence, enhancing the balance among ecology (climate), the economy, and equity.

#### *10.6 CLIMATE JUSTICE AS CONCERTED ACTION FOR ECO-EFFECTIVENESS*

This includes five key action-based eco-endeavours:

First, an arsenic-free<sup>217</sup> environment. Among others, these include toxic substances and materials such as phosphates, lead, PVC, Cadmium, and mercury. Hence, developing a “design filter” that phases out harmful substances such as mercury and PVC in the manufacturing sector, using eco-effective design criteria.

Second, it needs to duly follow informed personal preferences,<sup>218</sup> devices, or options. In other words, well-considered and ethically informed choices can lead to significantly greater eco-effectiveness than choices made without such reflection or deliberation. A rethink and redesign are increasingly urgent and relevant, particularly in this regard. Furthermore, preferential options for ecological intelligence,<sup>219</sup> respect, delight, and fun are critical.

Third, create the “X List”,<sup>220</sup> which includes a conscientious mention of potentially harmful substances that are directly or indirectly harmful to human and planetary health. These are teratogenic, mutagenic, and carcinogenic agents, such as benzene, asbestos, vinyl chloride, antimony trioxide, and chromium.<sup>221</sup> Positively, however, a preferred (“P List”) is also of paramount relevance. This includes certain substances deemed safe and healthy for use in food production, consumption, and manufacturing.

Fourth, reinvigorating the positive list<sup>222</sup> is extremely important. This entails a sober redesign initiative that moves beyond being merely “less bad” and instead strives to be genuinely

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<sup>216</sup> Ibid., p. 121.

<sup>217</sup> Ibid., p. 166.

<sup>218</sup> Ibid., p. 168.

<sup>219</sup> Ibid., pp. 171-173 passim.

<sup>220</sup> Ibid., p. 173.

<sup>221</sup> Ibid., p. 174.

<sup>222</sup> Ibid., p. 177.

beneficial—that is, to design products that become “food” within either biological or technical metabolic cycles.<sup>223</sup>

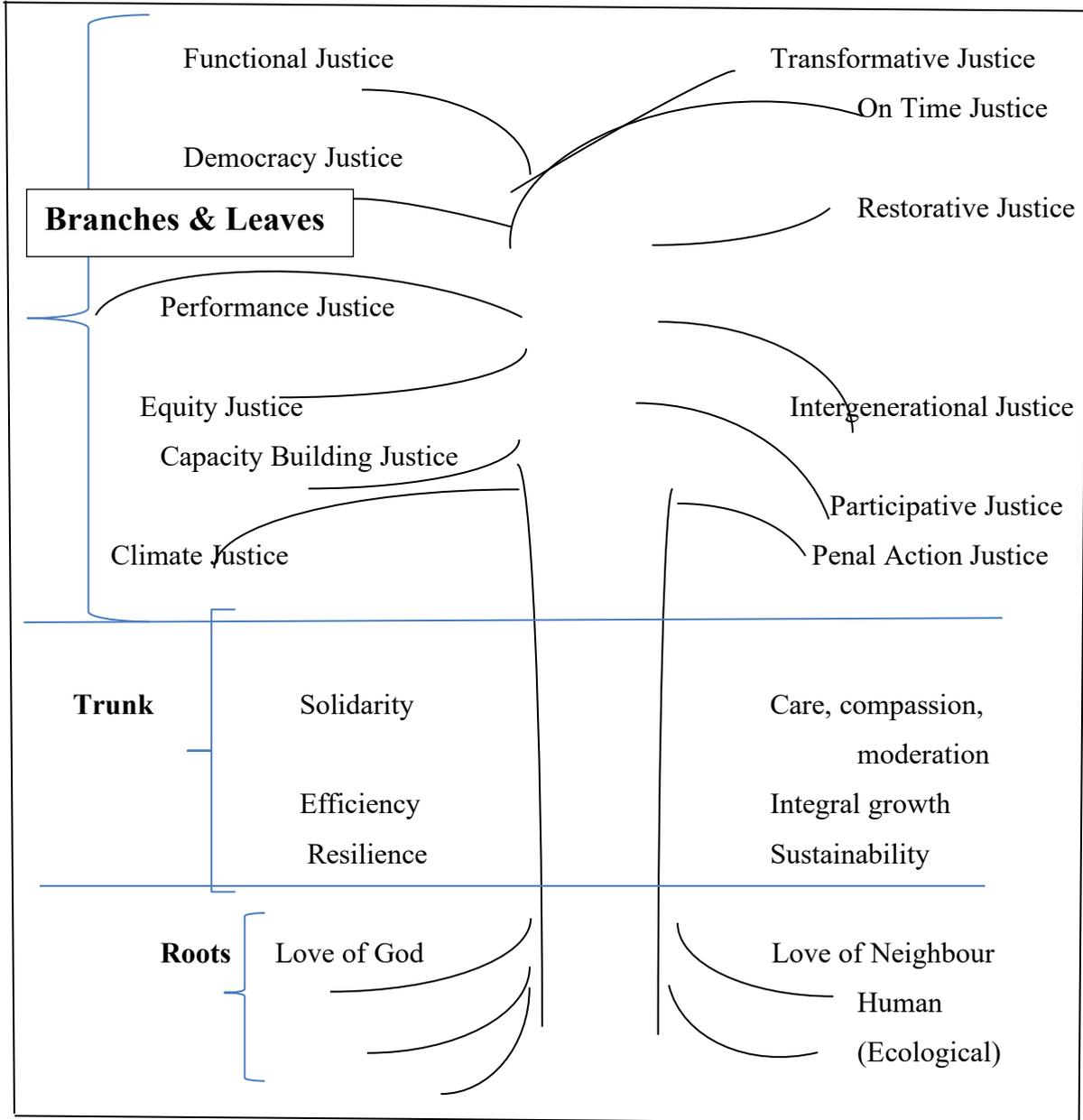
Fifth, there is an urgent need for reinvention. This requires a radical shift towards more resilient and sustainable “breeds,” “brands,” and design paradigms that move beyond conventional biological and technical cycles. For example, this shift entails reimagining mobility systems not merely as vehicles, but as “nutria-vehicles”—systems designed to contribute positively to ecological cycles. Similarly, transportation infrastructure can be reconceptualised to support eco-housing, eco-agricultural spaces, and multifunctional green environments. In this sense, a nutria-vehicle that does not emit toxic greenhouse gases (such as CO<sub>2</sub>) could actively enhance ecological quality, creating greener spaces for leisure, co-housing, and eco-farming, among other applications.<sup>224</sup>

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<sup>223</sup> Ibid., p. 179.

<sup>224</sup> Ibid., p. 180.

10.7 THE TREE OF CLIMATE JUSTICE



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10.7.1 THE GOLDEN RULE AS THE KEY “ROOT” (MT. 22:37–39)

This is epitomised by all Abrahamic faiths (Judaism, Islam, and Christianity). Hessel, Dieter, and Ruether (2013:679) hold that, “*the centre and zenith of all value-based approaches towards the creator, fellow human and the created world. It underscores both the verticalist and horizontalist trajectories, particularly of the human person towards God, environment, climate and sustainable living...*”<sup>225</sup>

<sup>225</sup> Hessel Dieler, Rosemary Ruether (eds) Christianity and Ecology, Cambridge, MA, Harvard University Press, 2000 p. 594.

#### 10.7.2 CLIMATE ETHICS “TRUNK” AS FUNDAMENTAL AND RESILIENT

This includes an ensemble of vibrant and resilient vitamins, values, traditions, ingredients, materials, and related concepts, particularly climate solidarity, care and the common good, precaution, moderation, efficiency, revolution, eco-resilience, eco-sustainability, and integral human growth/development.

#### 10.7.3 CLIMATE ETHICS “BRANCHES” AND “LEAVES” AS FUNDAMENTAL AND CRITICAL

These entail a key ethical edifice and a plethora of interdependent, integral “branches” and “leaves” for the “survival” of the entire climate ethics tree. These include the ethics of climate justice:

##### a) Capacity building in Climate Justice

It emphasises that every person, community, and institution has the obligation and potential to address different climate-related challenges locally, nationally, and globally.

##### b) Performance Justice in Climate Justice

This insists that every person, community, and institution must promote multiple endeavours to decarbonise our planet.

##### c) Equity and Equality in Climate Justice

It emphasises equal treatment measures for prevention, mitigation, adaptation, and damage and loss, as well as the distribution of all benefits and the burdens of climate vulnerability and catastrophes among current and future generations, both human and nonhuman.

##### d) Democracy and Transparency in Climate Justice

It calls for a true and open people-based approach, for, by and with the people, particularly in discussions on critical decisions pertaining to climate change issues, particularly at the BOP.

##### e) Penal Action in Climate Justice

This calls for punitive actions or sanctions, particularly for violations that involve multiple injustices or that destroy the environment, climate, and sustainable livelihoods as a whole.

f) Intergenerational Climate Justice

It underscores the importance of taking sustainable action and making decisions that promote climate justice, human dignity, and the collective well-being of future generations, both human and nonhuman, for millions of years to come.

g) Functional Climate Justice

This calls for the fair allocation and distribution of limited natural resources, which are critical and urgent, particularly to promote sustainable solutions to climate change challenges.

h) Participative Climate Justice

It underscores equitable and honest opportunities for participation and rights, particularly in decision-making on climate justice issues, with a special focus on the individual and local levels.

i) Restorative Justice in Loss and Damage in Climate Justice

This demands adequate, rightful, and sustainable solutions and reparative mechanisms from perpetrators of climate justice, particularly for victims of climate vulnerabilities, locally and globally.

j) Transformative Justice in Climate Justice

It underscores the importance of ongoing, interconnected, and multiple processes, particularly within the climate change regime and narrative; consequently, it calls for a holistic procedural and action model to address climate change as a whole.

k) On Time Justice in Climate Justice

This underscores the importance of making well-judged decisions and taking timely, appropriate action as part of our individual and collective responsibility to decarbonise the planet and restore climate justice—here and now.

# CHAPTER ELEVEN: CLIMATE JUSTICE NARRATIVE AND THE NATIONALLY DETERMINED CONTRIBUTIONS (NDCs)

## 11 INTRODUCTION

### 11.1 *NATIONALLY DETERMINED CONTRIBUTIONS*<sup>226</sup> (NDCs)

This refers to a conscientious and systematic climate action plan adopted by parties (i.e., countries) to reduce greenhouse gas emissions and effectively adapt to climate vulnerabilities and risks. Indeed, this was spearheaded in particular by the 2015 Paris Agreement. The Nationally Determined Contributions' key goal is to initiate “a transformative shift to development that is greener and more sustainable... shifts in the different sectors of the economy and provide an opportunity for rethinking how a society produces and consumes”.<sup>227</sup> It is based on a “Bottom-up” approach rather than a “Top-down” one.

Among other reasons, the justification for the inception of the NDCs is the critical global climate urgency and a “SOS” to decarbonise the planet by and through all parties on an equitable and sustainable basis. Methodologically, using the best science, equity, and smart climate innovation. Arguably, the NDCs are an integral component of the Paris Agreement, whereby it demands each party or nation to prepare,<sup>228</sup> communicate, and foster the NDCs to reduce climate vulnerability caused by ever-worsening emissions. From a jurisprudential perspective, some elements of the 2015 Paris Agreement regarding NDCs are legally binding, while others are not.

### 11.2 *NATIONALLY DETERMINED CONTRIBUTIONS SUBMISSION STATUS AND CRITICAL HIGHLIGHTS*

The NDCs timeline framework originated from the 2015 Paris Climate Change Agreement. Article 4.9 suggests a five-year period as ‘a common’ time for the implementation of climate change measures as encapsulated in the NDCs. For instance, if an NDC was submitted in 2015, its time frame would be 2020. The Paris Climate Change Agreement calls on every nation to communicate and submit new NDCs and targets, responsibly and transparently, each year. Unfortunately, some aspects of the Paris Agreement are not legally binding. Nonetheless, the

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<sup>226</sup> [www.un.org](http://www.un.org) searched on the 16<sup>th</sup> May, 2025.

<sup>227</sup> Ibid.

<sup>228</sup> Cfr. Paris Agreement Article 4, paragraph 2, 2015. Read also 4.3-4.6, 4.8-9, 4.12 and Article 6, 7, 13.7b-11 and 14.

specific objective of the NDCs is to advance global decarbonisation and support climate change mitigation and adaptation locally and globally.

### **11.3 NATIONALLY DETERMINED CONTRIBUTIONS (NDCs) LEGAL STATUS HIGHLIGHTS**

First, while the strengths and potential of the Paris Agreement—particularly in advancing collective global decarbonisation and effective adaptation—are widely acknowledged, not all elements of the Agreement relating to Nationally Determined Contributions (NDCs) are legally binding. In most instances, the level of ambition remains a matter of national determination and political will. Nonetheless, several NDC-related obligations are predominantly procedural in nature and, as such, are legally binding on all Parties under the Agreement:

*“Prepare communities and maintain NDCs. Pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions. Provide information necessary for clarity transparency and understanding (CTU) in communicating NDCs. Communicate NDCs every five years. Account for NDCs and promote environmental integrity, transparency, accuracy, completeness, comparability and consistency and ensure the avoidance double counting. Regularly provide information on national inventories of emissions by sources and removals by sinks of GHG’s and information necessary to track progress made in implementing and achieving NDCs.”<sup>229</sup>*

### **11.4 SALIENT CONTENTS OF NATIONALLY DETERMINED CONTRIBUTIONS**

According to Article 4.2 of the Paris Agreement, Parties are required to include a mitigation contribution in their Nationally Determined Contributions (NDCs), making it one of the most explicit and binding provisions on NDC content. In addition, the Lima Call for Climate Action invites Parties to communicate their adaptation planning efforts or to include an adaptation component within their NDCs.<sup>230</sup> Taken together, these provisions resonate—both directly and indirectly—with the core trajectories of mitigation and adaptation, as well as with financial support, technology development and transfer, capacity-building, and transparency of action and support, all of which are central and urgent to the effective implementation of the Agreement.<sup>231</sup>

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<sup>229</sup> Cfr. European Capacity Building Initiative (ECBI) Pocket Guide to NDCs, 2018, p. 14 of 90.

<sup>230</sup> Cfr. Paris Agreement Article 4.2.

<sup>231</sup> Cfr. UNFCCC, Guide to Negotiations: Summary for Policy Makers. Paris Agreement pp. 21-23 passim.

### 11.5 MECHANISM FOR PARTIES' ACCOUNTABILITY

First, beyond the diverse, complex, and often challenging task of articulating mitigation targets within their NDCs, the Paris Agreement establishes multiple trajectories for accountability among Parties, thereby strengthening transparency, comparability, and mutual trust within the global climate regime:

*“Up-front information to be provided by Parties when submitting their NDCs (Article 4.8). Accounting by Parties of their NDCs (Article 4.13). Accounting by Parties of ITMOs (Article 6.2). Common modalities, procedures, and guidelines for the transparency of action and support (Article 13.13), which could include rules on the information to be provided by Parties under Article 13.7 on their progress in implementing and achieving their NDCs.”<sup>232</sup>*

Second, the UNFCCC has provided a highly systematic and user-friendly framework and guide for Parties to submit their NDCs. It entails creating an UNFCCC user account, gaining access to the interim NDC registry to submit NDC-related documents and/or key information, and publishing NDC-related documents.

### 11.6 TANZANIA'S NATIONALLY DETERMINED CONTRIBUTIONS: NDCs SALIENT GOALS

#### a) Adaptation Contributions and Its Rationale

First, according to the National Determined Contribution report of July 2021, the government of Tanzania envisages *“embarking on a climate resilient development pathway. In doing so, it will reduce the impacts of climate change variability and associated extremes as drought and floods... The adaption measures are expected to significantly reduce the risks of climate related disasters... Access to clean and safe water for total population in urban and rural areas will be increased from 86% and 67.7% respectively in 2015 to 100% by 2030. Based on a conservative and a worst-case scenario of 50cm and 1m sea level rise by 2100, the contribution will verifiably reduce the impacts of sea level rise to the islands and coastal communities, infrastructure and ecosystems, including mangroves...”<sup>233</sup>*

Second, Tanzania's adaptation measures' priority map will tackle multi-sectoral gaps and challenges, prioritising agriculture,<sup>234</sup> livestock, energy, coastal, marine, environment and

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<sup>232</sup> Ibid., Paris Agreement 2015.

<sup>233</sup> The United Republic of Tanzania Vice President's Office, Nationally Determined Contribution. July 2021 p. 7.

<sup>234</sup> Ibid., pp. 9-13 passim.

fisheries, water, sanitation and hygiene, tourism, land use and human settlements development, health, infrastructure, disaster and risk reduction and management, gender mainstreaming, capacity building, research and systematic monitoring, technology development and transfer.

b) Mitigation Contributions and Rationale

First, the Tanzanian government has conscientiously identified four critical sectors as priority areas. This is due to their significant decarbonisation potential. Hence, *“Tanzania will reduce greenhouse gas emissions economy-wide between 30-35% relative to the Business-As-Usual (BAU) scenario by 2030, “whereby about 138-153 million tons of carbon dioxide equivalent (MtCO<sub>2</sub>e)-gross emissions is expected to be reduced, depending on the baseline efficiency improvements, consistent with its sustainable development agenda. Priority mitigation sectors are energy, transport, forestry and waste management. These are amongst the sectors that contribute to GHG emissions in Tanzania currently, and are expected to increase...”*<sup>235</sup>

Second, due to its vast and reliable natural gas endowments of about 57 trillion cubic feet of discovered reserves (by 2021) and over 100 million cubic feet, which have been exploited to produce 527 MW,<sup>236</sup> Tanzania is determined to embark towards an eco-friendly energy transition or *“Avant-garde”*.

Third, from a waste management perspective, Tanzania’s government is mobilising the private sector, stakeholders, and communities in particular, to spearhead greater and effective involvement of transforming waste into energy, new management models, site and waste disposal management systems, recycling, reuse, reduce, and dump management systems and power generation programs in particular.

Fourth, among other critical components, there are essential elements for the effective and efficient implementation of Tanzania’s NDCs. These include the measurement, reporting, and verification (MRV) system, institutional arrangements and governance system, professional expertise, and the NDC database.<sup>237</sup>

Lastly, other existing players and tools involve carbon credits through the Clean Development Mechanism (CDM) and the REDD+ mechanism, which stands for Reducing Emissions from Deforestation and Forest Degradation. These are increasingly widespread models for

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<sup>235</sup> Ibid., p. 13.

<sup>236</sup> Ibid., p. 14.

<sup>237</sup> Cfr. Ibid., pp. 19-21 passim.

decarbonisation and compensation, particularly in poor and developing nations, including Tanzania.

#### 11.7 SOME CRITICAL GAPS AND DISCREPANCIES

##### A) Ambition Gaps

The current NDCs module or regime covers only about  $\frac{1}{3}$  of the targeted emissions reductions needed to be at a bargain-basement level. This is critical and urgent for substantially reducing the irreversible risks and vulnerabilities posed by Climate Change.

##### B) Budgetary Gaps and Limitations

A post-2030 critical climate change regime analysis shows that *“It is extremely unlikely that the goal of holding global warming to below 2 °C can still be reached. Even if the NDCs are fully implemented, the carbon budget for limiting global warming to below 2°C will be about 80% depleted by 2030. Given currently available carbon estimates the available global carbon budget for 1.5°C will already be well depleted by 2030.”*<sup>238</sup> In some cases, especially in the Global South, access to climate finance has become impossible. This applies to the pledges as well. Mitigation and adaptation funds are a case in point.

##### C) The Business-As-Usual (BAU) Syndrome

Indeed, concerted and effective action, particularly by subnational, non-state actors, stakeholders, businesses, academia, and FBOs, is essential. Unfortunately, there is very limited, vague, and uncoordinated quantitative and qualitative data and information available about the role of such non-state actors in filling the emissions gap. Undeniably, these actors have incredible potential in our collaborative quest to decarbonise our planet.

##### D) Policy Gaps and “Schizophrenia”

Up to 2022, in Tanzania, there was a multiplicity of non-cost-effective and inconsistent NDC bodies, including policies, targets, action plans, strategies, and pathways across different government sectors, as well as a lack of conscientious standardisation of renewable or green energy. Among others, these include solar, wind, and geothermal energy production, as well as efficient, eco-friendly transport such as trains, trams, and cars.

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<sup>238</sup> Pocket Guide to NDCs under the UNFCCC.

#### E) Ethical/Moral Discrepancies and Gaps

There is insufficient transparency, trust, and accountability, particularly in NCD monitoring, reporting, and evaluation systems and regimes. Indeed, this is pathetic, particularly in the context of climate change mitigation. Furthermore, in 2022, there is a very limited, both qualitatively and quantitatively, ethical “resilient corpus” and accountability, particularly regarding credible monitoring, reporting, and evaluation expertise and databases, especially for adaptation and resilience-building targets and activities. Systemic corruptive practices are also commonplace.

#### F) Lack of Adequate Capacity in Resource Mobilisation and Technical Resilience

Fundamentally, there is a lack of an effective NDC resource mobilisation toolkit in many low-income developing nations, particularly in Africa. This includes relatively limited financial opportunities, a lack of scientifically credible databases and sources, weak governmental institutions, structures such as “think tanks” and “politicising” of everything, including climate change, NDCs, natural catastrophes, pandemics, etc. Lastly, there is still a significant gap in the accessibility and sharing of information and technologies for the effective implementation of NDCs as a whole.

### ***11.8 NATIONALLY DETERMINED CONTRIBUTIONS: THE ROLE OF CITIES IN CLIMATE CHANGE MITIGATION***

Urban resilience, as a means of enhancing climate change mitigation and adaptation, particularly against climate-related risks and vulnerabilities, is critical and urgently needed.

First, this will substantially reduce climate change-related deaths, illnesses, disruptions to urban businesses, severe heatwaves, pandemics, biodiversity loss, coastal ecosystem degradation, food insecurity, scarcity, and unsustainable rural-urban migration, both locally and globally. Hence, it reduces unnecessary, high financial costs associated with climate change-related disasters.



*(A village transformed by clean water in Babati District, Tanzania. Source: <https://www.wateraid.org/tz/stories/climate-change-mitigation-for-health-and-wealth>)*

Second, smart adaptation directly to such disaster programs and investments has remarkable immediate benefits both to urban settings and through the provision of sustainable urban infrastructures, land use resources and management, provision of employment opportunities, of inter-sectoral linkages, partnerships and capacity building in risks and disaster management systems in the promotion of sustainable urban communities and livelihoods both in the short-medium and long-term scenarios.

Third, efficient urban climate change mitigation and adaptation plans have huge positive effects, particularly in reducing and effectively responding to the ever-worsening urban-related plastic, food, clothing, harmful chemicals, paper and transportation footprints. Hence, underpinning the critical nexus are the potential and opportunities for implementing Nationally Determined Contributions (NDCs) not only in and by developing nations like Tanzania and across the African continent, but also among developed industrialised countries globally.



*(The Mitigation of Climate Change in Agriculture (MICCA) project in the South Ulugurus, Tanzania. Source: <https://www.weadapt.org/placemarks/maps/view/793>)*

# CHAPTER TWELVE: REIMAGING CLIMATE ACTION FOR CLIMATE JUSTICE

## 12 INTRODUCTION

### 12.1 PREAMBLE

Fundamentally, SDG 13 of the 2030 Agenda for Sustainable Development reiterates the collective global need and urgency for scalable solutions to mitigate further climate vulnerabilities, locally and globally. The Paris Climate Change Agreement, 12<sup>th</sup> December, 2015, provides a salient roadmap for a range of climate actions, on the one hand, to decarbonise the planet and, on the other, to enhance climate resilience and comprehensive adaptive capacity. According to the Seventieth Session of the United Nations General Assembly, Agenda items 15 and 116, climate action is “a charter for people and planet in the twenty-first century. Children and young women and men are critical agents of change.”<sup>239</sup> Briefly, the key trajectories of climate action include strengthening resilience and adaptive capacity; integrating credible climate policies, strategies, and plans; raising awareness; and providing education on mitigation and adaptation.

### 12.2 JUSTIFICATION

Today, more than ever, humanity and the planet stand at a defining moment. Climate change-related vulnerabilities and their catastrophic impacts threaten the existence and sustainability of all life forms, locally and globally. On the ratification of the Paris Agreement in 2015, 183 parties “submitted their national climate plans in their first NDCS under the Paris Agreement, of which 177 contain a vision of low-emission development and 129 set out an overall vision for adaptation and climate-resilient development.”<sup>240</sup> Briefly, given the ever-increasing threats of climate change to the planet and humanity, the urgent need for collective climate action goals, policies, plans, strategies, arrangements, and reporting mechanisms cannot be overstated. It remains an existential imperative at the individual, national, regional, continental and global levels.

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<sup>239</sup> United Nations’ General Assembly Seventieth Session Agenda Items 15 & 116.

<sup>240</sup> United Nations, Climate Action and Support Trends 2019, p. 15.

### 12.3 CLIMATE ACTION AND EDUCATION

First, transformative climate education acts as the “loci” and key multiplier factor for lifestyle behavioural change, for both personal and collective action, locally and globally. For the world community to achieve 1.5 °C by 2030 and net-zero by 2050, we need a highly climate-literate and climate-conscious population. Among other things, this calls for collective accountability, particularly from pupils, students, teachers, activists, religious leaders, academics, policymakers, planners, politicians, and the media. Hence, inculcating both “hardware,” “software,” and “civic” green skills across the entire socio-economic and emotional spectrum.



*(Eco-villages in Tanzania - A fight against climate change. Source: [https://international-partnerships.ec.europa.eu/news-and-events/stories/eco-villages-tanzania-fight-against-climate-change\\_en](https://international-partnerships.ec.europa.eu/news-and-events/stories/eco-villages-tanzania-fight-against-climate-change_en) )*

Second, beyond critical soft skills, future sustainable and green economies and livelihoods necessarily require transformative cradle-to-cradle green skills, eco-leadership, and socio-economic demarginalization Avantgarde among and for girls, women, and the poor workforce in particular. Admittedly, transformative education for climate action must “be embedded in all levels of education and in formed institutions, communities and workplaces. Education systems must become more resilient to climate-related disasters... Schools can play a critical role in increasing awareness of local communities...”<sup>241</sup>

Third, education for climate action must necessarily go hand in hand with bolstering socio-economic investments by balancing the linkage between sustainability and digitalisation. It has recently been projected that the “market size of the global digitised construction industry or construction 4.0, using artificial intelligence and other technologies, is projected to increase from \$10 billion in 2017 to \$29 billion by 2027...”<sup>242</sup> Buildings, building materials, and the global construction industry account for about 40% of Global Greenhouse Gas (GHG)

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<sup>241</sup> <https://blogs.adb.org/blog/four-ways-education-can-fight-climate-change> searched on the 22nd November, 2024.

<sup>242</sup> Ibid.

emissions.<sup>243</sup> Quality, proactive, climate-resilient education and transformative skills in the construction industry could significantly enhance the sustainability and resilience of local and global ecosystems and biodiversity for thousands of years to come.

Fourth, education for inter- and multidisciplinary climate change studies, particularly by and in Africa, needs to be revisited. This needs to go hand in hand with the attainment of both climate science and transformative technical green skills. Inspire, stimulate and motivate a credible green revolution necessary for eco-resilience and sustainable economies and communities in Africa in particular. Among the best models are those from Columbia and Stanford. For the University of Columbia, it was the first new school in 25 years and for Stanford, its first new school in 70 years,”<sup>244</sup> underpinning the relevance and urgency of the search for climate solutions against ever-growing climate vulnerabilities and risks.

Fifth, climate education aimed at students’ capacity for collection awareness is key, especially in “moulding” thoughtful cradle-to-cradle and pro-eco-friendly attitudes and choices among tertiary students. Hence, preparing future leaders, decision-makers, parents, citizens, and academics as “ambassadors” of change, with greater multiplier effects for a greener planet and an eco-justice transition in Africa, in particular. This exactly resonates with SDG 13. Sustainable Development Goals (SDGs), which underscore climate resilience, adaptive capacity, and the improvement of eco- and climate education, as well as human and institutional capacity for climate change mitigation, adaptation, and risk management. In short, it is now high time to collectively unleash the transformative power of education and life skills for climate action, resilience, and sustainability.

Sixth, systematic and credible climate change education for eco-resilience needs to be methodologically grounded in the nexus between tertiary education on climate change and sustainable livelihoods. Consequently, a paradigm shift from “simple content-based, silo approaches of pedagogy to a more systemic and ‘deeper’ enquiry that draws together biophysical, socio-economic and socio-psychological understandings... Education for Sustainable Development (ESD) as an integral component of quality education and a critical tool for sustainable development has gained global currency.”<sup>245</sup> Leal Filho *et al.* in *Environmental Science Europe* (2021, 33:109) aptly sketch the salient, broad-spectrum “satellites” and the interconnected, interdependent “software” and “hardware” aspects

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<sup>243</sup> [www.weforum.org](http://www.weforum.org) searched on the 23<sup>rd</sup> November, 2024.

<sup>244</sup> *Ibid.*, searched on the 21<sup>st</sup> December, 2024.

<sup>245</sup> <http://doi.org/10.1186/s12302-021-00552-5> searched on the 22<sup>nd</sup> December, 2024. Walter Leal Filho *et al.* *Environ. Sc. Eur* (2021) 33:109.

necessary for quality climate education. These include efficiency, ethics, science, gender, engagement, health, students, SDGs, collaboration, eco-sustainability, community curriculum, higher education, behaviour change, performance, knowledge, communication, and the future.<sup>246</sup>

#### *12.4 THE ANATOMY AND KEY CONTOURS FOR CLIMATE JUSTICE FOR AFRICA*

First, more than ever before, tertiary education needs to “critically rethink a new approach, particularly on the centrality, urgency and relevance of climate justice. Fundamentally, this must necessarily be value-based, interdisciplinary, transformative, skills-based and sustainable.

Second, education for climate justice necessarily focuses on a paradigm shift from mere freedom for all to inclusive peace with and for humanity and all climate goals and resources. Hence, fostering the urgent component towards global climate justice locally and globally.

Third, in global food production systems, methods, and supply chains, tertiary education provides more resilient, eco-friendly, and action-oriented practices. Among others: reduction of carbon emissions (GHGs), fair-trade agricultural products, “Cradle-to-Cradle” production mechanisms, and climate justice synergies and networks.

Fourth, at the practical level, the daily routines of tertiary education and trainees should be rethought and redesigned, especially to reduce both individual and collective carbon footprints. Further, the engineering and design of future universities, offices, campuses and buildings need to be eco-efficient, green, energy productive (e.g. with flowers, trees, solar systems, bio-gas systems, etc.), and resource efficient (e.g. with eco-friendly doors, windows, water use and management systems, etc.). At this juncture, unnecessary air travel among university scholars, academics, and professionals should also be discouraged or minimised wherever possible. Zoom, Skype, and other video conferencing platforms, as well as the latest visual technologies, should be encouraged. Hence, envisioning carbon-neutral centres.

Fifth, tertiary academic modules and life skills need to avoid, in particular, the risks of extreme departmentalism, compartmentalisation, isolation, and mere specialisation. Hence, the urgent call for deeper, more comprehensive, and more transformative multi- and interdisciplinary climate justice solutions and competencies, ingrained in all academic modules (curricula), particularly ecology, agriculture, geology, sustainability, engineering, geography, business,

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<sup>246</sup> Ibid.

economics, entrepreneurship, sociology, and chemistry, to mention a few. This new climate justice tertiary education model opposes the former and the current (2023) fragmented, isolated, theoretical-over-empirical approaches as a whole.

Lastly, among other components, a new climate justice in tertiary education must necessarily be grounded in key ethical, religious, and spiritual values that are transformative. These include earthkeeping and caring values, beliefs, norms, standards, life views, worldviews, principles, benchmarks, both formal and informal. This should be coupled with a positive and critical renewal of climate justice and socio-economic, cultural, technical, and political spaces. Among other things, this should include shifting from our own space to a planetary space, from short-termism to long-termism, from distance to urgency, from pure consumerism to sufficiency, sustainability, and resilience, and from fragmentation to integration.

#### *12.5 MULTILATERALISM, SDG-PARIS SYNERGIES, AND THE NORMATIVE IMPERATIVE OF CLIMATE JUSTICE*

First, according to the foreword of the Independent Group of Scientists appointed by the UN Secretary General in 2019, “2030 Agenda of Sustainable Development and the Paris Agreement on Climate Change that was adopted in the same year, are tangible proofs of the benefits of multilateralism and the indispensable role that the United Nations can play to find global solutions to global challenges. Their implementation offers a pathway to a world where poverty, inequality and conflict will not blight the life chances of millions of people who are currently denied the opportunity to enjoy their fundamental rights and freedoms”.<sup>247</sup>

Second, credible implementation of the SDGs necessarily demands a radical, continuous rethink and restructuring, particularly in policy interventions, equity, and, above all, respect for the global resource SOS. This is critical as the global population reaches 9 billion in December 2022. To effectively and sustainably fast-track our quest against the irreversible vulnerabilities wrought by the climate crisis, “targeted actions that bring tangible benefits and limit the trade-offs on multiple fronts... Maximising on the interlinkages between the 2030 Agenda and the Paris Agreement by leveraging Climate and SDG Synergies, has the potential of achieving both agendas and guaranteeing a liveable future for next generations by leaving no one behind...”<sup>248</sup> Briefly, this underpins the critical and normative principle and vision for a fundamental option

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<sup>247</sup> Independent Group of Scientists appointed by the Secretary General 2019 (Preface from Gro Harlem Brundtland).

<sup>248</sup> Cfr. <https://sdg.un.org/topics/climate-action-synergies>.

for people experiencing poverty, not only humans, but entire natural systems as a whole, locally and globally.

#### 12.6 CLIMATE ACTION THROUGH ENERGY TRANSITION ETHICS

First, the entire taxonomy and use of energy for development are not merely technological and economic issues but also ethical matters. Admittedly, the shift from fossil fuels to renewable energy sources has fewer harmful impacts on the environment, biodiversity, climate, and sustainability. This underpins both the provision, availability, and affordability of energy, particularly for people experiencing poverty globally. Hence, there is a need to radically re-examine the intrinsic nexus between energy and holistic justice. This is aptly re-emphasised, especially in the two great Encyclicals, “*Caritas in Veritate*” (Charity in Truth) (2009) by the late Pope Benedict XVI, and, more recently, in “*Laudato Si*” (2015) by the late Pope Francis.

In the same vein, Pope Francis (June 2019) reiterates that a just transition to a low-carbon global society must be based on the values and virtues of transparency, moderation, intergenerational justice, and “decisive climate action here and now”.<sup>249</sup>

Second, the post-Paris Climate Summit emphasises a global shift away from fossil fuels toward renewable energy sources. Hence, a salient focus towards decarbonisation of the globe through more technological energy efficiency,<sup>250</sup> security, equality, reliability and inclusivity.

Third, from scientific and technological perspectives, it must be noted that the current global energy transition “revolution” focuses not only on the mechanical production, distribution, and consumption of eco-friendly energy but also on the ethical rethinking of equity, justice, and equality. That is, a critical redistribution of energy, resilience, risks, vulnerability, wealth (welfare), etc. Conversely, the ethics of the energy transition must necessarily address key socio-economic dilemmas and questions, both individually and collectively.

- a) Planning Justice dilemmas for energy transition: Who plans? The state, citizens, NGO’s, CBOs, FBOs, politicians, academia, and the private sector? Etc.
- b) Distributive justice dilemmas for energy transition: mandate/power to distribute? Who bears the burden? Who is responsible for the responsibility?

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<sup>249</sup> Cfr. *Laudato Si* No. 262.

<sup>250</sup> Steven Cohen, *The Sustainable City*, New York, Columbia University Press, 2018 pp. 16-18 passim.

- c) Control/Regulatory<sup>251</sup> Justice dilemmas for energy transition: Who regulates and/or coordinates the energy transition oversight? The government alone? Responsible ministries? Policy makers? Private sector? etc.
- d) Policy Dilemmas for energy transition: this involves ethics for decision making. Which technological avenues need critical review? Who makes that? Which innovation trends need to be adopted? What critical ethical challenges and options, particularly about the reliability of energy prices, supply chains, infrastructure, carbon emissions, waste, etc.?
- e) Design<sup>252</sup> Ethics and Dilemmas for the Energy Transition: Which key design strategies and processes should be adopted, and what systemic ethical parameters and benchmarks should be used? Who is involved in designing, managing, consuming, and buying energy products and systems? Briefly, both the social value and the economic value of energy for human survival and thriving need to be critically re-examined!
- f) Environmental/Biodiversity Dilemmas for energy transition: The current global endeavour presents complex ethical challenges and conundrums. Among others, these include qualitative and quantitative existential predicaments, especially for marginalised indigenous peoples in low-income communities locally and globally. Furthermore, renewable energy projects might cause irreversible destruction, vulnerabilities, and impacts, particularly on global ecosystems, biodiversity, and habitats.
- g) Behavioural Dilemmas for energy transition: This is a critical and urgent space for a rigorous ethical transformation and action. It requires ecological resilience grounded in a deep, radical lifestyle and a change in character to reduce individual and collective carbon footprints. It is not simply “sufficient for individuals to consume differently by buying green energy, they should also consume less by adapting their lifestyles, especially in terms of transportation and diet”.<sup>253</sup> At this juncture, we urgently need to shift from a fossil-fuel-based transportation culture and lifestyle to a renewable, eco-friendly energy system. Almost 30% of all global greenhouse emissions come from fossil-fuel-powered transportation systems. These include road, air and marine. Briefly, there is an urgent need to dismantle the current fossil-intensive energy model.

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<sup>251</sup> Mark J. Mwandosya, *Regulatory Challenges in Africa: An Empirical Analysis*, Dar es Salaam, Mkuki na Nyota Publishers Ltd., 2021 pp. 15-29, 33-37, 167-176 and p. 298 passim.

<sup>252</sup> <https://onlineethics.org/cases/energy-ethics/ethics-energy-transitions> searched on the 18th June, 2024.

<sup>253</sup> <https://philpapers.org/rec/BOUEET-2> searched on the 19th June, 2024.

**12.7 RENEWED AND CONCERTED CLIMATE ACTION AND JUSTICE BY CLOSING THE ENERGY POVERTY NEXUS**

First, global energy transition endeavours must necessarily and substantially address the existing socio-economic and structural inequalities and injustices. This can be realised, particularly, through proactive ethical frameworks and spaces that prevent further injustices among individuals, communities, businesses, and nations. Such an effective and efficient pro-poor energy transition framework needs to inculcate, particularly, the virtues, values, and normative ideals of care, inclusivity, moderation, dignity, equity, and empathy.



*(End Energy Poverty in Africa to Combat Climate Change. Source:*

*<https://allafrica.com/stories/202001080727.html>)*

Second, energy transition models must address the principles of availability and affordability, as well as the spaces for and with people with low incomes. Consequently, leaving no one behind. Nonetheless, this principle of equity in energy system design alone “is insufficient to create equitable outcomes and in some contexts, creates or exacerbates conditions of inequity and injustice.” Users’ financial “muscles” or circumstances require critical analysis and review to ensure justice and fairness in socio-energy framework regimes. Hence, avoiding the untold burdens on poor individuals in their daily struggles to meet basic needs, particularly food, shelter, health care, and education.

Second, a fair and credible energy transition framework for ending the energy poverty nexus needs to address, in particular, the geographical location or positionality component, especially for vulnerable and marginalised individuals and communities.

Third, the shift, particularly from carbon-intensive fossil models to new, more sustainable and resilient socio-energy models, requires significant focus and prioritisation, especially in building capacity in energy resilience and governance systems. There is a need to re-address current systemic disconnects in energy systems. Quite often, locally and globally, marginalised peoples and communities “lack the authority, opportunity and ability to influence energy decisions as well as the knowledge and skills to do so effectively...” This lack of capacity creates and exacerbates participatory and procedural injustices, limits access to reliable, timely information, and reduces transparency in decision-making. Indeed, participative justice is essentially a participative process. Consequently, there is a need to dismantle systemic and human barriers for change and true transformation.

#### *12.8 IMPACTFUL CLIMATE CHANGE ACTION THROUGH GENDER EMPOWERMENT TO ADAPT*

First, it is undeniable that quality, value-based education unleashes remarkable capabilities in human adaptability and resilience, particularly for women and girls. It has recently been observed that “for each additional year of education that girls acquire, a country’s resilience to climate disasters increases 1.6-3.2 average points. One study also projects a 60% lower death toll from extreme weather events by 2050 if the share of women receiving a lower secondary education increased from 30% to 70%”.<sup>254</sup>

Second, from a civil society perspective, promoting inclusive and responsible awareness, particularly among the Bottom of the Pyramid (BOP), is critical. For this framework to be impactful and sustainable, a coordinated approach with other stakeholders, such as the state, the private sector, academia, Faith-Based Organisations (FBOs), and Non-Governmental Organisations (NGOs), is indispensable. That is adapting a profound multi- and interdisciplinary toolkit across the board.

Third, from a jurisprudential perspective, transformative constitutional awareness and framework, especially for climate-induced disaster preparedness, need to be given higher priority than ever before. Among other requirements, the role and rule of law within a legal framework for climate action justice, transparency, equality, accountability, trust, sustainability, efficiency, and equity need special, urgent, critical attention and implementation locally and globally.

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<sup>254</sup> Cfr. Suzanne Ehlers, Safeena Husain *et al.*, Education for Climate Action: Why Education is Critical for Climate Progress?.

Briefly, transformative, inclusive, and credible education that enhances human and societal capabilities to adapt is one of the most salient and effective tools, particularly for promoting long-term, resilient responses to the unprecedented, destructive risks and scenarios associated with climate change, especially among marginalised and poor populations. Hence, raising the collective climate action Responsibility and Capability Index (RCI).<sup>255</sup>

### *12.9 CLIMATE ACTION AND JUSTICE THROUGH THE ETHICS OF SUSTAINABILITY*

First, the ethics of sustainability encompasses fundamental value-based principles, attitudes, and axioms. These include, among others, the principles of human dignity, peace, personality, moderation, subsidiarity, aesthetics, equity, care, servant leadership, interdependence, community, respect, resilience, modesty, generosity, sufficiency, institutionalised solidarity, trust, integrity, intergenerational forgiveness and reconciliation.

Second, an ethically potent framework and edifice of sustainable livelihoods entail an ensemble of critical criteria and norms, particularly the following: fundamental, integration, urgency, precautionary, main-cause, reversibility, savings, co-operation (networking), rotation, motivational, virtues (faith, hope, charity/Agape), prudence, justice, temperance/moderation, and fortitude.

Third, a credible framework in enhancing sustainable growth must necessarily embody sustainable management and responsible stewardship of entrusted resources. This is particularly important for non-renewables. As Christoph Stückelberger succinctly puts it, “exploitation, overconsumption, violation and oppression by us human beings threaten life... We need institutionalised ways for a sustainable lifestyle... We need political pressure to implement strong climate policies. We need economic incentives such as lower prices for renewable energy, such as solar energy, and higher prices for non-renewable energy...”<sup>256</sup>

Fourth, as regards consumption patterns and policies, there is an urgent need for a radical paradigm shift from “destructive consumerism to sustainable livelihoods, lifestyles and cultures”.

Today, there is a remarkably exponential rise and proliferation of a hyper-consumer class. This has given rise to compulsive motorisation, the extraction of raw materials<sup>257</sup> and extractives

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<sup>255</sup> A new innovative model developed in the United Kingdom’s Development Agencies (Christian Aid) against GHGs adopted by other Organisations e.g. Bread for All in Switzerland – see <https://www.ecoequity.org/2023/05/wealth-tax-of-0-5-could-cover-uks-fair-share-of-loss-and-damage-fund/>.

<sup>256</sup> Christoph Stückelberger, *We All are Guests on Earth*. Bangalore, Dharmaram Publications, 2010. pp. 57-58.

<sup>257</sup> Cfr. [www.wcwatch.org](http://www.wcwatch.org) searched on the 29<sup>th</sup> June, 2024.

and colossal lifestyles worldwide. Hence, leading to insatiable cravings and appetites for more and more global inequalities, the decline in human well-being, the degradation of biological biodiversity and ecosystems, and untold existential ecological catastrophes. As Pope Francis in “*Laudato Si*” insists, “it is not possible to sustain the present level of consumption in developed countries and wealthier sectors of society, where the habit of wasting and discarding has reached unprecedented levels. The exploitation of the planet has already exceeded the acceptable limit, and we still have not solved the problem of poverty”.<sup>258</sup>

Lastly, the principles and edifice of ethics for sustainability and sustainable livelihoods are critical to climate action and justice. Among others, it encourages and includes the following salient features and norms: simplification of all aspects of life; critical reassessment of consumer policies, lifestyles, philosophies, inefficient and irresponsible consumer models; the throwaway society; non-Cradle-to-Grave living styles; waste mismanagement; destructive materialism; unsustainable prosperity; and consumer mania, locally and globally.<sup>259</sup>

The concept and practice of a responsible consumer worldview and lifestyle is central, particularly in the Catholic Social Teaching. Among others, the social Encyclical of “*Populum Progressio*” (The Development of Peoples) by Pope Paul VI underscores the call for a paradigm shift from ‘having’ to being. In the same vein of thought, “Centesimus Annus” by Pope John Paul II in 1991. He makes this critical observation:” Equally worrying is the ecological question which accompanies the problem of consumerism... In his desire to have and enjoy rather than to be and grow, man consumes the resources of the earth and his own life in an excessive and distorted way. At the root of the senseless destruction of the natural environment lies an anthropological error, which unfortunately is widespread in our day...”<sup>260</sup>

From an Islamic perspective, responsible consumption and holistic mindfulness are key. The Quran insists that humans practice moderation in both production and consumption. Hence, it underscores a non-wasteful lifestyle and worldview. Among others, it says: “But waste not by excess; for Allah loveth not the wasters.”<sup>261</sup> Briefly, Islam’s concepts of measure and balance symmetry (“*mizan*”),<sup>262</sup> vice-regent (“*haliq*”), human interaction with creation (“*khalq*”), responsible trusteeship (“*khilafah*”), moderation (“*wasat*”), and right and just action in this

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<sup>258</sup> Pope Francis, “*Laudato Si*” No. 27.

<sup>259</sup> Markus Vogt pp. 639-650 passim.

<sup>260</sup> Cfr. Centesimus Annus No. 37. See also Nos. 43, 55-57. Also, Encyclical Caritas in Veritate No. 66 and “*Laudato Si*” Nos. 34, 46, 50-52, 109, 112 and 135 passim in Terris (1963).

<sup>261</sup> Quran 6:141, see also verses 7:31, 11:7, 17:26, 38:36, 53:49, 80:8, 36:36 and 55:7-9.

<sup>262</sup> Quran 55:7-9, also Pontificio Institute Di Studi Arabi E D’ Islamistica “Encounter”, Vol. 2018 pp. 15-30 passim.

world (“*amal salinat*”), cooperation (“*ta’ awun*”) reiterate the entire Islamic teaching on sustainable consumption and living as a whole. In Hindu faith and ethics, the concepts and practices of responsible consumption and moderation are intrinsically interrelated with self-realisation and self-actualisation. Satisfaction of material wants is a significant step towards self-actualisation, a good life, and true happiness. According to the Buddha, ecological harmony and sustainable lifestyles and patterns would only be realised when ecological harmony does not destroy its equilibrium with human plants (soil flora), animals (soil fauna), and all beings.

This is founded on Buddhism’s philosophy of compassionate consciousness with and for creation, through loving-kindness (“*mudida*”) and compassion (“*karuna*”).<sup>263</sup> Fundamentally, Buddhism’s edifice for a good and moderate life, efficiency, and holistic consistency is reminiscent of the following virtues and life views. Superior conduct/behaviour, superior attitude or frame of reference, perfect wisdom and trustworthiness.<sup>264</sup> The Buddhist view, particularly regarding responsible consumption, upholds a profound ecological consciousness and loving-kindness, grounded in a holistic continuum. Its key trajectories include cultivating holistic compassion, recognising the interdependence of all selfless things, practising self-giving, and cultivating contentment. Briefly, a radical change and rethinking, particularly of current production, distribution, and consumption attitudes and patterns, can be achieved remarkably through Buddhist eco-spirituality.<sup>265</sup> For instance, in 2008, Tzu Chi founded an innovative company, “Da Ai Technology,” in Taiwan. It aimed to reduce both ecological destruction and irresponsible consumption by setting very high performance standards for recycled epidemic production. It is based on an excellent social business model. It recycles millions of tons of clothing, PET bottles, poly chips, and fabrics into eco-friendly products. Hence, it significantly reduces the overconsumption of natural resources.<sup>266</sup> In the same vein of thought and practice, the Cradle-to-Cradle sustainability and eco-efficiency-based best model, it has recently affirmed that, if “humans are truly going to prosper, we will have to learn to imitate nature’s highly effective Cradle-to-Cradle system of nutrient flow and metabolism in which the very concept of waste does not exist. To eliminate the concept of waste means designing things/products, packaging, and systems... “Most packaging can be designed as a

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<sup>263</sup> Jose Nandhikkara, *Environmental Interface*, Bengauru Dharmaram Publications, 2015 pp. 19-22.

<sup>264</sup> Cfr. *The Teaching of Buddha* Tokyo, Kosaido Printing Co. Ltd., 1997, p. 62.

<sup>265</sup> Jose Nandhikkara, *Environmental Interface*, pp. 17-34 passim.

<sup>266</sup> Isis Ibrahim, George Shaji K, Klaus Vellguth (Hg) “In der Schöpfung Heimat finden” Stuttgart, Grunwald, 2020 pp. 154-155 passim.

biological nutrient...”<sup>267</sup> Briefly, technically, if “a product must for the time being, remain a ‘monstrous hybrid’, it may take extra ingenuity to design and market...”<sup>268</sup>

#### *12.10 CLIMATE ACTION THROUGH TECHNOLOGICAL DEVELOPMENT AND TRANSFER*

First, the innovative development and transfer of eco-friendly, effective, and efficient technological models, mechanisms, and frameworks remain critical milestones in climate action and justice, locally and globally. According to the Climate Change 2023 Synthesis Report, strengthening “technology innovation systems can provide opportunities to lower emissions growth, create social and environmental co-benefits and achieve other SDGs. Policy packages tailored to national contexts and technological characteristics have been effective in supporting low-emission, innovation and technology diffusion...”<sup>269</sup>

Second, climate action can be spearheaded particularly by and through technical creativity, innovation<sup>270</sup> and excellence. However, linear production models should be avoided. Hence, focusing on the complex interconnectedness and interdependency for a more resilient model, particularly through climate action-based innovative resilient<sup>271</sup> models locally and globally. From an ethical space, the concept and practice of “Responsible Research and Innovation in the context and space of climate action (RRI or RI) is increasingly gaining momentum and acceptance, particularly in the European Union.

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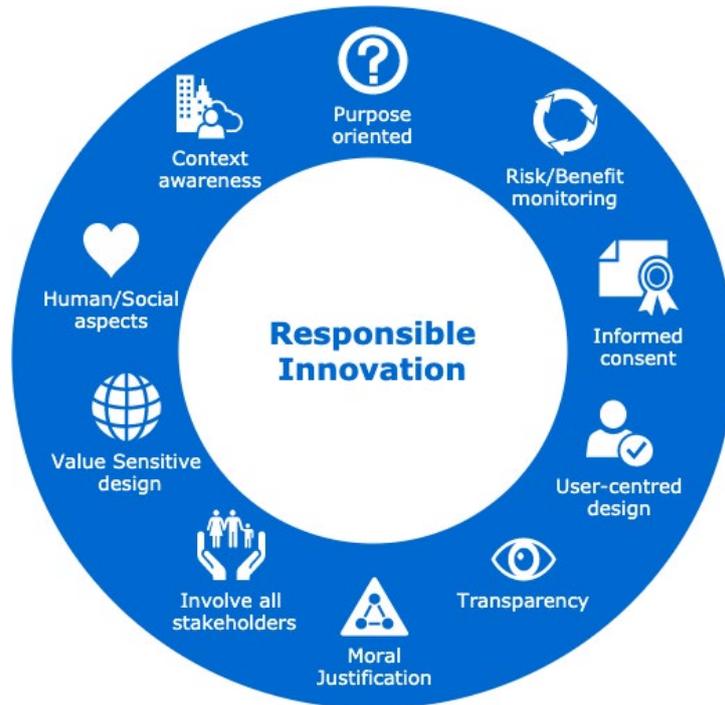
<sup>267</sup> Michael Braungart, McDonough William, *Cradle to Cradle: Remaking the Way We Make Things*, London. Vintage Books, 2009, pp. 104-105.

<sup>268</sup> *Ibid.*, p. 115.

<sup>269</sup> IPCC, *Climate Change 2023 Synthesis Report Summary for Policymakers*, Geneva, 2023, p. 33.

<sup>270</sup> Cfr. Markus Vogt p. 569.

<sup>271</sup> *Ibid.*



(Source: *responsible research and innovation* - Google Search)

Undoubtedly, RRI's edifice encompasses the following critical aspects, directly or indirectly connected to both technological innovation and climate action. These include, always doing the right thing, good governance, creative learning processes, unlocking potentialities and gender equality, transparency and open access and caring for the planet or stewardship<sup>272</sup> in particular.

#### **12.11 CLIMATE ACTION THROUGH THE ETHICS OF MITIGATION, ADAPTATION, CLIMATE FINANCE, LOSS AND DAMAGE**

First, ethics of transparency for collective and responsible climate action, particularly through long-term climate finance, are critical and urgent. This has been particularly re-emphasised by the Conference of the Parties in Sharm el-Sheikh, Egypt, from the 6th to 20th November, 2022. Financial support, particularly for developing countries, "is a critical enabler to enhance adaptation and mitigation actions and address inequalities in access to finance, including its costs, terms of conditions and economic vulnerability to climate for developing countries."<sup>273</sup>

Second, credible frameworks and models of climate governance ethics are critical for implementing climate mitigation and adaptation at the local and global levels. This includes promotion of the ethics of inclusivity, trust, democratic decision-making process, commitment, political will, equity, equality, and partnership,<sup>274</sup> and holistic justice.

<sup>272</sup> Cfr. <https://www.great-project.eu> searched on the 8<sup>th</sup> July, 2024.

<sup>273</sup> Cfr. IPCC, Climate Change 2023 Synthesis Report p. 33.

<sup>274</sup> Cfr. *Ibid.*, p. 32.

Third, an effective climate finance regime must shift its focus from the global “pledge syndrome” and “systemic failure” to a more equitable, realistic, and transparent approach, especially through enhanced international cooperation on finance. Indeed, this can qualitatively “capacity and address soft limits to adaptation and event rising risks, especially for developing countries, vulnerable groups, regions and sectors...”<sup>275</sup>

Fourth, ethically, Christoph Stückelberger identifies and aptly summarises three critical spaces that underpin an ethical preferential rule for a credible climate change action model. He emphatically observes that the “first step is to honestly recognise that support is not given to the weakest even if one accepts it as an ethical criterion... In some cases, it may save more lives if priority is given to people who use limited resources efficiently and effectively... The justification of the preferential rule is the number of lives to be finally saved”.<sup>276</sup>

Fifth, the ethical space of moderation (“Middle path”) and life view could bring about remarkable positive changes, especially within the climate justice and action framework today and tomorrow. It underpins and demands a new culture of individual and collective mindfulness with and for climate justice. Jeffrey D. Sachs considers this ethically oriented model for impactful climate action a practical imperative for twenty-first-century survival. “Our peril is unprecedented, and human knowledge, values and social institutions are far behind the curve... Our global response to date has been so obtuse, so absurd, and so shortsighted that it almost seems that humanity has a death wish...”<sup>277</sup>

Last, fairness and equity remain one of the key cornerstones of an inclusive and interlinked<sup>278</sup> climate justice action model. It provides a consistent synergy among interconnected, interdependent aspects of justice. Hence, safeguarding fundamental values and virtues such as dignity, solidarity, freedom, harmony, and true love (Agape).

#### ***12.12 CLIMATE ACTION THROUGH THE ETHICS OF CARBON FOOTPRINT***

Empirically, it has recently been affirmed that CO<sub>2</sub> global emissions grew by “1.1 in 2023, increasing 410 million tonnes (Mt) to reach a new record high of 37.4 billion tonnes (Gt)... Emissions from coal accounted for more than 65% of the increase in 2023.” Further, the Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) unveiled ever-growing trends in global net anthropogenic GHG

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<sup>275</sup> IPCC, Climate Change 2023 Synthesis Report.

<sup>276</sup> Christoph Stückelberger, “We All are Guests on Earth” pp. 42-43.

<sup>277</sup> Jeffrey D. Sachs, *The Price of Civilization*. London: The Bodley Head 2011, p. 175.

<sup>278</sup> Christoph Stückelberger, *Global Trade Ethics*. Geneva, WCC Publications, 2002 p. 49.

Emissions trajectories, especially in the last decade, 2010 to 2019.<sup>279</sup> Among other key drivers, the transport industry, non-eco-friendly and degenerative carbonisation, economic development, trade, and consumption models and patterns have played substantial roles in the increase in global greenhouse gas emissions.

Ethically, the following ethical norms, criteria and underpinnings can be a critical moral ground and means towards a credible, sustainable and resilient climate action drive in and for Africa in particular:

Climate action *Avantgarde* through the principles of care, compassion, equity, and intergenerational justice.<sup>280</sup>

Paradigm personality, complementarity and interdependency among all creatures, awe for creation/environment and resources, globalisation of the eco-sympathy and resilience index, common and welfare, transformative and sustainable climate action model through the ethics of planetary regeneration instead of degeneration through regenerative<sup>281</sup> architecture and designing instead of short-term hyper consumerist lifestyles through planetary traditional moderate anthropocentrism instead of radical anthropocentrism, through planetary holism instead of reductionism, through collective environmental responsibility revolution instead of the ever-growing destructive ideologies, instead of eco-nihilism and indifferentism and eventually through a new planetary resilient and regenerative thinking and action. Briefly, humanity and the planet in the post-2025 epoch urgently need a new, timely eco-ethics software (*locus ethicus*) embedded in the transformative ethics of climate justice, resilience, and planetary regeneration, as a means toward resilient and regenerative livelihoods locally and globally. Undoubtedly, a new, relevant, innovative, and eco-regenerative education model and pathways for resilience and climate justice are of critical importance in Africa in particular and worldwide in general. Among other things, this underscores what the Dalai Lama and Greta Thunberg stand for.

### **12.13 CLIMATE ACTION THROUGH CARBON CREDIT: MORE ACTION THAN PROPAGANDA IS NEEDED**

Carbon credit eco-solutions, models, strengths, engineering, and pathways are increasingly common for reducing global greenhouse gas emissions and are widely recognised as critical worldwide. Carbon credit mechanisms offer and unlock a plethora of strengths and new

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<sup>279</sup> Intergovernmental Panel on Climate Change (IPCC) Climate Change 2022 Vol. 1 p. 217.

<sup>280</sup> Axel Gosseries, Lukas H. Meyer (eds.), *Intergenerational Justice*, Oxford University Press, 2009, pp. 219-248 passim.

<sup>281</sup> Martin Grassberger, *Regeneration* Wien, Residenz Verlag, 2024, pp. 148-166 passim.

opportunities, especially for carbon and climate change offsetting, and for promoting planetary quality and regeneration through meaningful action at the global level.

Despite a global increase in interest in offsetting carbon emissions, especially among nations, businesses, academia, policymakers, entrepreneurs, NGOs, CBOs, and others, several legal, technological, and ethical hurdles remain regarding the process, criteria, and spectrum of credit purchasing. This discourse is still growing rapidly, unleashing incredible opportunities, especially for carbon reduction pathways. Nonetheless, at this juncture to very pertinent questions for Africa remain critical. Why do we urgently need to buy carbon credits at all? Second, how can Africa/Africans in particular benefit from the carbon credit market(s), and thirdly, how can the carbon offset mechanism in Africa spearhead Africa's (national, organisational, personal) carbon emissions?

### **A brief Synopsis of the Carbon Credit Regime:**

#### A) Proximate Initiative of the Carbon Market

Carbon credit trading systems have their proximate origins in the Kyoto Protocol of 1997 and were strengthened by the 2015 Paris Agreement and later by the 2021 UN Climate Change Conference in Glasgow (COP25). These promoted the development of global decarbonisation frameworks.

#### B) Carbon Credit Calculus and Simple Logic

A carbon credit is an emission allowance or franchise for a specified quantity of carbon dioxide (CO<sub>2</sub>) or similar anthropogenic greenhouse gases (GHGs). Statistically, for instance, it is urged that for every one credit, one can release “into the atmosphere one metric ton (2204 pounds) of CO<sub>2</sub> or an equivalent amount of another GHG. A company is eligible to receive credits if it cuts its emissions below a certain threshold...”<sup>282</sup>

#### C) Key Archetypes of Carbon Credits

To date, there are two distinct typologies of carbon credits. These are: Certified Emission Reduction (CER); and Voluntary Emission Reduction (VER).<sup>283</sup>

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<sup>282</sup> <https://eos.com/blog/carbon-credits> searched on the 16th January 2025.

<sup>283</sup> Ibid.

#### D) Multiple Actions-Based Ways to Devise Carbon Credits

These could be through re-greening/reforestation<sup>284</sup> projects or endeavours, through regenerative land stewardship and sustainable management, eco-energy efficiency initiatives, and innovative pathways.

#### E) Carbon Credits Verification Model<sup>285</sup>

This is a rigorous and pair-staling process, which necessarily encompasses:<sup>286</sup> blueprinting and illustration; attestation by an unconventional or autonomous third party; establishing a credible GHG emissions baseline; monitoring and calculating a concrete decrease in emissions; administering a verification account or delineation; checking that the listing and circulation are ready for market trading; and ongoing screening and attestation.

It must be noted that there is no single approach or model for the planet's decarbonisation. Most of them play a fundamental, interdependent, reciprocal, and relevant role in planetary resilience, sustainability, and regeneration across short-, medium-, and long-term scenarios.

#### *12.14 URGENT AREAS OF CLIMATE ACTION*

The most salient areas for climate action today and tomorrow include:

- a) Pre- and Primary School Space and Tertiary Value-laden Education and Eco-Governance.
- b) The Innovative Space on Climate Justice, Resilience, and Planetary Regeneration.
- c) Climate Action Modelling in Daily Space (especially in re-greening, responsible consumption, waste separation, sustainable and efficient use of non-renewable resources (e.g. water, etc.).
- d) Enhanced and Invigorated Climate Action Space through networking, partnership and collaboration locally and globally in funding, research, R&D, etc.
- e) Augmenting and strengthening the Climate Justice National and Institutional Policies and frameworks at all levels of socio-economic, political, academic, technological, and environmental spaces and platforms.

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<sup>284</sup> Ibid.

<sup>285</sup> Ibid.

<sup>286</sup> Ibid.

## CONCLUDING REMARKS

The development of a relevant climate justice framework for Africa is critical for human survival, planetary resilience, and ecological regeneration. The direct and indirect consequences of the Anthropocene, including human-induced environmental disasters and escalating systemic risks, are increasingly evident. Recent events, such as the devastating wildfires in California (United States) in January 2025, illustrate the growing scale and intensity of climate-related crises and prompt renewed reflection on how societies think about, respond to, and manage the environment at both local and global levels. These developments underscore the urgency of collectively reimagining and remapping a more resilient future—one that supports sustainable livelihoods and fosters the regeneration of vital life-support systems, including air, water, biodiversity, natural resources, and ecosystems. In this context, Africa has both a particular vulnerability and a crucial role in shaping innovative, context-sensitive responses to climate injustice. Strengthening climate justice frameworks, governance systems, and collective responsibility is therefore essential to safeguarding ecological integrity and human well-being for present and future generations.

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### ***About this Publication***

“Aidan G. Msafiri accentuates in this well-timed and splendid book on ‘*Climate Justice, Resilience and Planetary Regeneration: A Compendium for Africa*’, critical, inspirational and innovative eco-pathways and alternatives for a much safer, resilient, healthier, regenerative, sustainable and edifying earth communities in Africa in particular. He aptly put before us a rare ‘eco-justice compass and model’ for responding to the ever-growing and threatening climate risks and vulnerabilities that are hard-hitting the entire planet, and Africa in particular. He exposes a profound multi- and interdisciplinary approach not only for Africa’s academia, researchers, think tanks, government, policymakers, private sector, faith-based organisations, civil societies, etc., but also for everyone living and cherishing this planet for many years to come. Admittedly, this exceptionally rare book presents critical, compelling solutions, alternatives, answers, clarifications, and responses that are urgent and relevant to climate justice, environmental resilience, and planetary regeneration and sustainability for hundreds and hundreds of years to come. This is particularly resonant throughout all twelve chapters of this African eco-justice compendium. Hence, this is a must-read masterpiece and an ‘*Eco-Magnum Opus*’, particularly for African universities and institutes of higher learning, pioneered by an outstanding African scholar, climate justice professional, research fellow, eco-think tank manager, and academician whom I have known and admired for many years. The author has published several professional books and articles worldwide, particularly on climate justice and environmental ethics. He is the founder and managing director of the Kilimanjaro Consortium for Development and Environment (KCDE) and UN Climate Change Ambassador for Tanzania. Most of his books are found on Amazon. He lives in Moshi, Kilimanjaro, Tanzania – East Africa”.

***Mag. Lukas Mandl***

***Member of the European Parliament for Austria***

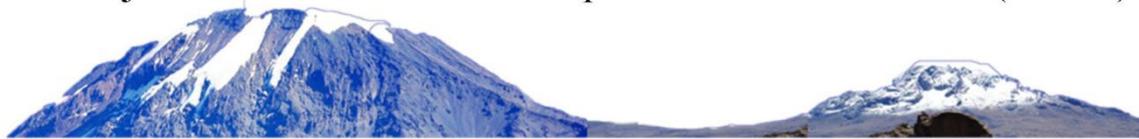
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