



Climate-U

Transforming Universities
for a Changing Climate

Climate change in policy agendas and frameworks: what role for higher education?

Transforming Universities
for a Changing Climate
Working Paper Series
No. 23, September 2024.

By Charlotte Nussey,
Lorena Sanchez Tyson,
Lia Bogitini,
Amanda Lange Salvia,
Janaina Mazutti,
Kaburu Jeremy Munene,
Ledua Waqailiti
and Palesa Molebatsi.



UK Research
and Innovation



Climate-U

Transforming Universities
for a Changing Climate

Climate change in policy agendas and frameworks: what role for higher education?

**Transforming Universities for a
Changing Climate**
Working Paper Series, No. 23

**By: Charlotte Nussey,
Lorena Sanchez Tyson, Lia
Bogitini, Amanda Lange Salvia,
Janaina Mazutti, Kaburu Jeremy
Munene, Ledua Waqailiti and
Palesa Molebatsi.**

September, 2024

Contact: Dr Charlotte Nussey
Email at: c.nussey@leeds.ac.uk
Web: www.climate-uni.com
Twitter: @ClimateUniv

Free to download with use of suggested citation:
Nussey, C; Tyson, L; Bogitini, L; Salvia, A; Mazutti,
J; Munene, K; Waqailiti, L; Molebatsi, P. (2024)
*Climate change in policy agendas and frameworks:
what role for higher education?* Transforming
Universities for a Changing Climate, Working
Paper Series No. 23

© September 2024 Climate-U,
Institute of Education, UCL
20 Bedford Way, London, WC1H 0AL

ISSN: 2754-0308

Abstract

Climate change has been debated from scientific, political, educational and development perspectives, shaping international policy architecture. In this review we explore international policies through a cross-country comparative analysis of climate change and higher education policies in Brazil, Fiji and Kenya. Policy movement can occur through policy transfer, borrowing, translation or learning that takes place over the course of a country's policy cycle. Of these forms of movement, we argue that policy learning provides the most contextualised type of policy movement, as it is the most socially oriented. We suggest that integrated approaches to policy are necessary in order to achieve a socially oriented policy cycle. By analysing the vertical and horizontal scales along which the policy cycle unfolds, we show that there is a problem of integration along both of these dimensions in each of the three countries. This limits opportunities for policy development and enactment in Brazil, Fiji and Kenya, as integration links decision-making actors and actors with influence, as well as the main target groups of policies. We argue that better integration can be achieved through a move away from top-down approaches towards approaches that take advantage of the positioning of actors which facilitate integration in ways that bring non-traditional actors into the policy cycle. Because they straddle both the macro and meso levels in ways that may link decision-makers, influencers and target groups, higher education institutions (HEIs) are a good example of such actors. They possess the ability to engage both traditional and non-traditional actors and can do so by mainstreaming climate change and higher education policies in ways that draw in traditional, cultural and indigenous forms of knowledge. Following a cross-country comparative analysis, the discussion explores connections and disconnections in policy, asking where and how HEIs and actors were involved in policy development or enactment, where opportunities may have been missed, and what drives or hinders meaningful policy development or enactment in relation to climate change. We argue that the cases of Brazil, Fiji and Kenya generate useful insights into the changing fabric of institutional arrangements in these countries, yet the rigidity of relations along the horizontal and vertical scales makes it difficult for new or innovative institutional arrangements to arise between macro, meso and micro actors.





Authors

Charlotte Nussey is a Research Fellow at IOE, University College London's Faculty of Education and Society, working on the *Transforming Universities for a Changing Climate* study, and as a UCL Public Policy and Impact Fellow. Her research interests focus on the relationship between education and socio-ecological justice, and intersecting inequalities, particularly associated with climate, gender and place.

Lorena Sanchez Tyson is a Senior Lecturer in Education at the University of Hertfordshire's School of Law and Education. Her research focuses on education and international development, particularly in Indigenous contexts in Latin America, addressing issues of access, equity, social justice, and sustainability.

Lia Bogitini is an Affiliate Researcher for Transforming Universities for a Changing Climate research projects in Fiji. She is an Assistant Lecturer at the Fiji National University. Her research interests are environmental sciences, biodiversity conservation, sustainable development in higher education institutions and climate change resilience and mitigation in small island states.

Ledua Waqailiti is a consultant at the School of Pacific Arts, Communication and Education at The University of the South Pacific in Suva. Her research interests are resilience education in communities in Fiji, specifically looking at resilience to climate change issues that impact children and people, and promoting literacy education in the Pacific Island communities.

Amanda Lange Salvia is Research Associate for the project Transforming Universities for a Changing Climate at the University of Passo Fundo, Brazil. Her doctorate focused on energy sustainability at universities and current interests include the Sustainable Development Goals, the role of universities towards sustainability and the impacts of climate change. She is Associate Editor of the International Journal of Sustainability in Higher Education.

Janaina Mazutti is an Affiliate Researcher for the Transforming Universities for a Changing Climate research project in Brazil. She is an Environmental Engineer and a PhD student in Civil and Environmental Engineering at the University of Passo Fundo, Brazil. Her current studies focus on the role of universities and Green Offices in promoting climate action. Her interests include the Sustainable Development Goals, climate action, Green Offices and sustainable and smart cities.

Kaburu Jeremy Munene is a Research Associate for the Transforming Universities for a Changing Climate research project in Kenya. He holds a MSc in Sustainable Urban Development from Kenyatta University. His research interests are sustainable urban development, biodiversity conservation and environmental education.

Palesa Molebatsi is an Associate Lecturer and Research Fellow at IOE, University College London's Faculty of Education and Society. She completed her PhD on the nexus between higher education and development at the Centre for Researching Education and Labour (REAL), University of the Witwatersrand. Her research interests include the public good role of universities in South Africa, skills needs for the greening of critical industrial sectors such as the automotive and chemicals sectors, and theories of change in impact evaluations of government and donor interventions in education and training.

Table of contents

1. Introduction	4
2. Theories of policy movement in the climate and comparative education fields: transfer, borrowing, translation and learning	5
3. International climate change policy agendas, accords and frameworks: links and disjunctures with education	6
4. Methodology of the review	8
5. Three case studies of education and climate policy	9
5.1 Brazil	11
5.2 Kenya	13
5.3 Fiji	17
6. Discussion: what can we learn from these three cases?	23
7. Conclusion	26
References	28

1. Introduction

Climate change is the most significant global challenge of the 21st century. Overwhelming scientific evidence suggests that urgent action is needed within the next decade, and significant transformation is imperative by 2050 to curb the most devastating climate effects (IPCC, 2022). Yet despite growing attention to the issue since the 1970s, a relative scarcity of theoretical tools in the field (as well as supporting empirical evidence) means that policy responses to climate change are often developed without harmonised—i.e. coordinated or integrated—approaches to understand the phenomenon (Nikas, Doukas and Papandreu, 2019). Although the role of education in addressing the challenges of climate change is increasingly recognised, the education sector remains under-utilised as a strategic resource in mitigating and adapting to climate change.

This comparative review of policies considers the architecture of national climate change and education policy frameworks in Brazil, Fiji and Kenya, with a focus on the role of higher education institutions (HEIs). Within the specific focus of higher education policies, of some concern for us is the extent to which higher education links with other segments of education (primary, secondary and post-school) and types of education (informal and community education). The review examines the extent to which, given their links to other segments of the education sector in each national context, HEIs in these countries are prepared for and responsive to climate related policy interventions. In relation to this, it also examines the extent to which HEIs are embedded in multi-actor national policy responses to climate change, underscoring the importance of a healthy social contract to mobilise actors towards policy implementation. Some of the thinking in this global policy review draws on the systematic review conducted as part of the work of the Climate-U project, in which Nussey et al. (2023) mapped some ways in which universities might respond to the climate crisis through engagement with policy-makers, as well as the ways in which policies at the national, regional and international levels might create an 'enabling environment' for climate change policy at the institutional level (Kautto, Trundle and McEvoy, 2018). This bi-directional relationship between universities and external policy-makers, or institutional and national level policies, is an important dimension of policy-making that this review aims to understand.

Understanding the drivers of national climate change policies is complicated by their intersection with international policy drivers. This review takes this as a starting point and acknowledges that the debate about anthropogenic interference in climate is entangled with local and global discourses (scientific and otherwise) about what climate change is, what its impacts are, and how it can be addressed (Brüggemann and Rödder, 2020). In turn, the development and implementation of different public policies and policy instruments designed to combat the effects of climate change have been fraught with tensions in terms of different—and at times, conflicting—interests, often between scientific and social rationalities (Ansari, Wijen and Gray, 2013). An exploration of the different theoretical approaches used

for understanding and tackling climate change reveals certain normative and analytical contrasts and presuppositions (Antonio and Clark, 2015). The natural science approach to climate change has a history of reliance on positivist theories and frameworks (Wear, 2008), whereas the sustainable development approach encompasses a range of interlinking social, environmental, and economic theories and incorporating constructivist perspectives (Grist, 2008). Differing agendas amongst scientific communities, governments, and public and private sectors have thus given rise to uneven policy responses, making it challenging to create widely agreed-upon theoretical frames from which countries can build robust policies. For Hulme (2009), disagreements about climate change emerge because of differences in governance approaches and perspectives, understandings of power, and political ideologies, all of which influence the design of policies. Moreover, the various framings of climate change (whether this be as an environmental, economic, or social justice issue, among others) fundamentally affect the types of policy interventions that are developed and the actors who are involved (Hulme, 2009). Understanding the framings of climate and education, and the connections between them, thus remains an important task.

Following on from this introduction, section two provides a theoretical discussion on policy movement. In that section we detail the distinct ways in which local, national and international policies travel and interact either through transfer, borrowing, translation and/or learning. The choice or balance between these modes of policy movement has ramifications for the stages of the policy cycle in different national contexts. Thereafter, section three provides a literature review of various climate protocols, accords and development frameworks that have been in place since the 1990s. This review is of relevance given that the international climate policy landscape has an effect on the socio-political context in which national higher education systems operate and engage with national climate policies. Our methodology in section four outlines our documentary analysis of policies, acts and agendas in Brazil, Fiji and Kenya. This analysis explores whether and how specific reference to climate change and/or higher education is made in policy statements in each case. There we also foreground the importance of this documentary analysis in order to establish the degree to which there has been progress towards connected approaches to development which integrate development and/or growth, climate and education imperatives. In section five, the three case studies centred in this review are presented. We show that the case studies offer three very different contexts in terms of their socio-political histories, their educational systems and structures, and the environmental pressures which they face. Bringing together the policy history of Brazil, Fiji and Kenya in this way illustrates some of the debates on the international stage, and how they are translated at national levels. Our aim, in bringing these three cases together, is to highlight how understanding the linkages (as well as the potential disconnections) between higher education and climate policies helps to reveal the ways in which policies can be leveraged for successful climate actions and further climate justice. This leveraging primarily occurs through a social approach to policy development which addresses the need for policy frameworks that take into account diverse values, forms



of knowledge and discourses. We argue that it is also only possible through bottom-up, reciprocal relations in climate change and higher education policy implementation, where innovative, blended approaches are adopted.

Evidence stemming from the three national case studies thus sheds light on the extent to which global agendas on climate change and education articulate with national and local policies, acts and agendas. To this end, the review remains cognisant of the broad literature on different ways of understanding policy movement, and returns to them in the discussion part of the paper. In that part of the paper, we dissect policy movement by analysing the vertical and horizontal-scales along which the policy cycle unfolds. We also consider the extent to which integration exists between these scales in each case. On the basis of this we draw out the implications per case for climate change and higher education policies and analyse the ways in which they do or do not embed non-traditional actors in the policy cycle. We also ask where opportunities may have been missed, and what drives or hinders meaningful policy action in relation to climate change.

2. Theories of policy movement in the climate and comparative education fields: transfer, borrowing, translation and learning

Within the comparative and international educational field, as well as within the climate policy field, a huge range of literature exists that theorises different concepts or metaphors for ways in which local, national and international policies travel and interact. Dolowitz and Marsh (2000, p. 6) refer to *policy transfer* as 'a process by which knowledge of policies, administrative arrangements, institutions and ideas in one political system [...] is used in the development of policies'. In other words, the concept of transferral seeks to explain how and to what extent policies in one context might emerge in another (Needham, 2011). Such transfers could be regarded as 'soft' - by means of concepts, attitudes and ideas - or 'hard' - through the implementation of more concrete policy instruments and programmes (Evans and Davies, 1999, p. 382).

These international processes of transfer can also be conceptualised as policy borrowing, in which policies move from one context to another. The theory of *policy borrowing* emerged from the field of comparative education, where the debate on whether more recent international alignments of educational priorities and systems (exemplified by PISA¹ or indeed the SDGs² themselves) could be considered as a cross-national exercise in pursuing educational quality and equality, or rather as a more coercive form of policy transfer (Steiner-Khamsi and Waldow, 2012). Policy borrowing has also been applied to climate analysis: for example, in analyses of UK climate policies, Smith (2004) posits that policy formulation initiates

with international transfer processes, which in turn are folded into domestic processes when it comes to policy implementation. Crossley (2019) also argues that local contextual priorities help to explain why policies are borrowed (externalisation), how they are locally modified and implemented (recontextualization), and what impact they have on existing structures, policies and practices (internalisation). While local priorities may be foregrounded, globalisation can be seen as a domestically induced rhetoric that is mobilised during particular moments of policy tension. This is in order to generate reform pressure and build policy coalitions (Steiner-Khamsi and Waldow, 2012). While the term 'policy borrowing' can sometimes take on a pejorative tone, is not per se a bad thing. It can be constructive and effective under the right circumstances. Indeed it would be a short-sighted policy-maker who did not look at other contexts to gain an informed, evaluative perspective on the relationship between policies and educational outcomes (Burdett & O'Donnell, 2016).

A third set of ideas revolves around the idea of *policy translation*, which Needham (2011) distinguishes from transfer or borrowing as an alternative approach to understanding how and why policies are effective or ineffective. This transforms policies, taking them from general to localised guidelines which are iteratively established through knowledge of specific local conditions. The iterative process takes place over the course of the policy cycle. The policy cycle framework originates from the idea of organising and ordering the complexity of policymaking. It is a heuristic tool through which different stages of the ongoing and never-ending dynamics of policy processes can be segmented and then analysed (Capano & Pritoni, 2020). It was originally proposed by Lasswell (1956), the founder of modern policy analysis and public policy. He defined the stages of the policy cycle as: intelligence (evaluative information on the strength of policies); promotion; prescription; invocation; application; termination; and appraisal. Because it requires assessing and understanding policy effective-ness and ineffective-ness, policy translation may overlap with policy learning.

Finally, Raffe and Spours (2007) propose that policy learning has three dimensions: experiential learning; learning from other countries; and learning from local innovations or experiments. The distinction between policy borrowing and policy learning for Raffe (2011), is that policy borrowing involves searching the international experience for transferable 'best practice' while policy learning uses this experience for a wider range of purposes, including understanding one's own system better.

Whether policies are transferred, borrowed, translated or learnt, and whether through hard or soft modes of mediation, is determined by a mix of national and international factors which cut across political, social and cultural dimensions and shape educational aims with some specific and measurable outcomes (e.g. levels of literacy and numeracy), as well as more intangible aims (e.g. promoting national identity and inculcating moral and ethical values). Variations between these factors at the national and international levels and their effects on the application of policies in different contexts ought

1 OECD's Programme for International Student Assessment in reading, maths and science.

2 The United Nations' Sustainable Development Goals.

not be misunderstood, ignored or under-estimated as they lead to differences in the ways that the same or similar policy inputs are implemented in different contexts. There is no ideal blueprint for policy transfer, borrowing, translation or learning. Rather, the reasons for each are highly complex, dynamic and very much embedded in the context within which they exist. This is further complicated by the impetus for educational policy change not always being linked solely to educational reasons and outcomes, but instead heavily influenced by surrounding socio-political milieu (Burdett & O'Donnell, 2016). Thus, establishing causality is difficult.

In this paper, we particularly draw on the notion of policy learning, as it provides the most contextualised and socially oriented theorisation. We bring this theory together with questions of integrated approaches to policy. In the following part of the paper, questions of integration are considered through a literature review, which asks where and how climate and higher education—both in and of itself, but also through its connections with other sectors of education—are connected in international policy architecture, and the processes towards the various climate protocols, accords and development frameworks that have been in place since the 1990s.

3. International climate change policy agendas, accords and frameworks: links and disjunctures with education

The history of climate change and policymaking has been explored through scientific, political, educational, and development perspectives (Halsnæs and Trærup, 2009; Nachmany, Byrnes and Surminski, 2019). International collaborations and the range of outcomes they have achieved, including dialogues between disciplinary communities, have led to significant climate-related accords, which in turn have shaped (and continue to shape) the climate change debate. This part of the working paper takes a more specific look at how climate change policies and debates have been framed in the academic as well as 'grey' literature and will survey key reports and treaties in the international community, all of which feed into national policy landscapes in different ways. It looks at how these landmark moments have shaped and shifted the discourse on climate change and education, and whether or to what extent they have impacted the ways in which national and local governments engage with and enact policies.

Central to the contribution towards the development and enactment of climate change policies around the world has been the anchoring work of the International Panel on Climate Change (IPCC). Established in 1988, the IPCC was tasked with providing policymakers with ongoing scientific assessments on the state of knowledge about climate change and with coordinating international responses (including policies) to climate change. HEIs and academics have played leading roles in the development of the IPCC reports, first published in 1990. The IPCC has called for educational approaches to adapt and mitigate climate change, including awareness raising and climate change education within schools, but also acknowledging the importance of adult and

non-formal education, indigenous and local knowledges, and other inclusive forms of learning (such as participatory action research) and knowledge sharing (IPCC, 2014). However, the role of the IPCC remains advisory rather than formative or prescriptive (Hulme, 2009).

Such work fed into the creation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1991, which contained foundational principles for subsequent debates, agreements, processes and procedures related to climate change. Understanding 'climate change' in terms of the 'composition of the global atmosphere', the UNFCCC recognised the disproportionate effects and causes, calling in Article 6 for "education, training and public awareness" to play a role in developing and training programmes, providing the public with access to information, enhancing public participation and training scientific, technical and managerial personnel (UNFCCC, 1991). Other landmark agreements put forward emission reduction targets (through the Kyoto Protocol in 1997), platforms for enhanced action on mitigation efforts (through the Durban Platform in 2011), and stricter targets for the stabilization of greenhouse gas concentrations at levels sufficient to limit temperature increases and prevent further anthropogenic interference on climate (through the Paris Agreement in 2015; Chan, Stavins and Ji, 2018). While recognising that the impacts of climate change are disproportionate, however, these agreements tend not to call for the kinds of nuanced forms of education discussed by IPCC. In the Kyoto protocol, for example, where 'climate change' is framed as a technical concern with emissions reductions, corresponding calls in Article 10e focus on "training experts" and "national capacity building", in particular for developing countries (UNFCCC, 1997).

Whereas the Kyoto Protocol was largely regarded as a 'top-down' instrument centred on mitigations and caps on emissions amongst so-called developed countries, the Paris Agreement shifted towards a more 'bottom-up' approach whereby all parties submitted Nationally Determined Contributions (NDCs), or comprehensive climate action plans specific to each country context (Luomi, 2020; United Nations, 2021). However, the distributive nature of such provisions often means that negotiations and enforcement of regulations are state-based and therefore subject to state interests, and related laws and policies are often vague and not sufficiently stringent in terms of emission reduction targets (Benjamin, 2021). Thus, the role of the state in the preparation, communication, and achievement of NDCs has been—and continues to be—at the heart of climate change policy discourse and action. A concern, however, remains the extent to which different sectors are connected or operate within silos, and the extent to which different state responses are themselves conflicting, as this paper aims to explore.

The nature of climate change as an exceptionally complex and 'wicked' problem involving not only scientific evidence but local knowledges and adaptations also raises questions about the political nature of public policy deliberations. Indeed, despite evidence suggesting that there is a wealth of Indigenous knowledge that could address the impacts of climate change, such contributions are not often taken into account by policymakers



in the policy process (Shawoo and Thornton, 2019; Ford et al., 2020; Petzold et al., 2020). This has led many to advocate for further interdisciplinary cooperation and stronger engagements with grassroots and holistic approaches which emphasise the interdependence between communities and local ecosystems, therefore leading to a more inclusive policymaking process (Harlan et al., 2015; Lagi et al. 2023).

While the Paris Agreement aims to bridge contemporary policies with carbon-neutral and zero-emission aspirations, the Sustainable Development Goals (SDGs) outlined targets to be achieved before the year 2030 and aimed to treat 'development' in 'integrated' and 'indivisible' ways (UN, 2015). At first glance, the SDGs could be seen as synergetic in terms of how they address and embed climate change targets within different goals. Of the 17 total goals, there are those which specifically focus on climate action (Goal 13), affordable and clean energy (Goal 7), responsible consumption and production (Goal 12), and life below water and on land (Goals 14 and 15). In the climate-specific goal 13, education appears in target 13.3, which calls for "improving education, awareness-raising, and human and institutional capacity" on climate change mitigation, adaptation, impact reduction and early warning (UN, 2015), echoing the language of UNFCCC and previous agreements discussed above. The educational goal, SDG4, outlines the need to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all", including an access target for higher education (Target 4.3). Target 4.7 specifically mentions the need to promote 'education for sustainable development' through knowledge, skills, culture and global citizenship, tacitly framing the educational goal as underpinning others, and seeing education as instrumental to policy action (UNESCO, 2019a). Building on this, UNESCO acknowledged the links between SDG 4 and SDG 13's focus on climate action by highlighting that education is a key element of the response to climate change (UNESCO, 2019b), and the agency's Global Education Monitoring Report in 2020 emphasised even further the impact education has on climate action (UNESCO, 2020). Relatedly, the *Ministerial Declaration on Education and Awareness Raising* that was published following COP20 in 2014 declared that education plays 'a fundamental role for all countries to achieve climate-resilient sustainable development' and urged all parties to 're-emphasise the importance of education [...] on climate change and its effects'. Moreover, it called for the inclusion of education and awareness-raising on climate change 'in the design and implementation of national development and climate strategies and policies' (United Nations, 2014, p. 2).

Within the language of the SDGs and in climate policy discourse more broadly, there thus remain contestations in terms of how education is understood, and how it might benefit climate action. Often, the term education is deployed interchangeably with school and learning, thereby obscuring more nuanced and situated understandings of learning and making it difficult to meaningfully incorporate it into policy action (Leal Filho et al., 2017; 2020, p. 318). Nevertheless, the crisis calls for education in

general and higher education in particular, to move beyond 'business as usual' (Facer, 2020; McCowan, 2020).

The following part of this working paper considers what we know so far about attempts to do just that, reflecting on the empirical work that explores policies which bridge the gap between education and climate action. According to the IPCC, effective responses to climate change have and will continue to depend on policies and measures which are developed and implemented across multiple geographies (international, regional, national and sub-national) (IPCC, 2014). Thus, concerted efforts are required to identify whether and how policy can support or hinder educational interventions for climate change adaptation.

To preface the discussion, it should be noted that across much of the empirical literature there are contestations and variations in terms associated with both climate change/mitigation/adaptation/climate justice, and different understandings of 'education'. While broader terms such as *climate change education* or *education for sustainable development* often signal different modes and levels of education related to issues of climate, there is no robust consensus on what effective practice looks like, with different perspectives between different actors (Waldron et al., 2019), nor is there a comprehensive government policy framework to connect education with climate change (Reimers, 2021).

In attempts to bring debates around climate change education to the forefront of policymaking, agencies such as UNESCO have done extensive advocacy for climate change education and drafted various surveys and studies to inform policy. A 2018 survey administered in 83 countries analysed how the 1974 Recommendation on Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms – in which climate change is explicitly addressed under the guiding principle of human survival and wellbeing—was reflected in countries' contemporary education policy and curricula from pre-primary to tertiary levels (UNESCO, 2018). Self-reported country responses showed a high level of policy commitments as related to both the 1974 Recommendation and the SDGs, particularly SDG 4.7, related to education for sustainable development.

Another UNESCO study examined the content of 263 policy and curriculum documents from 10 countries³ to determine the extent to which education for sustainable development from pre-primary to upper secondary education was reflected and prioritised in commitments to achieving SDG 4. An analysis of national education laws, national education strategic plans, national curriculum frameworks (NCFs), and national subject-specific curricula revealed that across different national policies, references to Global Citizenship Education (GCE) and Education for Sustainable Development (ESD) were broadly expressed through cognitive, social and emotional, and behavioural dimensions (UNESCO, 2019a). The report found that the prioritisation of these interrelated learning dimensions varied greatly across the

3 Costa Rica, Japan, Kenya, Lebanon, Mexico, Morocco, Portugal, Republic of Korea, Rwanda and Sweden

different national laws, policies and curricula, further emphasising how broader policies and cooperation agreements related to climate change tend to be heterogeneous in terms of areas of focus and have differing degrees of (de)centralisation and overlapping approaches for risk management. Relatedly, a study by Læssøe and Mochizuki (2015) explored trends in national policy on education and climate change by analysing case studies from 17 countries from different global regions. The article examined the degree to which policies in support of ESD are integrated at national levels and argues that national governments tend to draw from 'soft governance' approaches to promote climate change education. These included the application of soft governance instruments such as consultations and non-normative advisory guidelines for implementing ESD and CCE.

What remains consistent across international declarations, government agreements, and policy discourses more generally is an emphasis on education as instrumental in contributing to policy action, as discussed in the previous section of this working paper. And yet, the disconnect that many empirical studies have to policy and the ongoing global political volatility with which governments may or may not (re)embed climate change in education policy (and conversely, education into climate change policy) is evident: research shows that many countries do not significantly invest in climate change education (UNESCO, 2020; Molthan-Hill et al., 2021), and the role of universities within this process is often not recognised (McCowan, 2020). The same is arguably true for investment in activities related to the other ways in which universities can respond to climate change (i.e. research and community engagement).

Thus, while policy rhetoric has opened up a space for rethinking approaches to climate change and education, it remains insufficient, and the need for new strategies and situated responses that are commensurate to the crisis at hand are more urgent than ever (Reimers, 2021). In cases such as Australia, there has even been a backslide in terms of advancing climate change education policies: whereas prior declarations on education goals placed climate change at the forefront (for example in the 2008 Melbourne Declaration), it has been increasingly marginalised across the national education agenda and curriculum (Gough, 2020).

The empirical landscape on the topic strongly suggests that climate is changing far faster than policy: dominating the debates on climate change have been top-down models which operate under the misguided idea that if governments and intergovernmental bodies embed climate change education into policy, that streamlined transformations across teaching and learning will ensue. As Reimers (2021, p. 24) argued, there remains an underlying assumption 'that climate change education is a technical challenge with a universal solution' and that mainstream, policy-ready approaches to education—if and when they were to be identified—could be easily adopted across international jurisdictions.

Not only does this reductionist and overly technicist view fail to explain limited results in policy areas like education, but it obscures the complex constitutive processes behind education and climate

change alike. Reimers (2021) refers to the recognition of the important role of education in addressing climate change and the simultaneous inertia in achieving the global climate goals as the ultimate 'paradox' (Reimers, 2021 p. 1). Equally, we argue there is a policy paradox: despite numerous commitments, multi-level declarations, agreements, and policy frameworks emphasising the need to design effective and responsive climate change education interventions, there is a disregard of the context-based particularities and needs of different regions and institutions.

Phelan and Lumb (2021, p. 175) argue that the principal challenge facing HEIs in particular lies in whether or not institutions and systems will be able to adopt 'a renewed fundamental purpose for higher education' that is firmly grounded in the 'pursuit of climate change mitigation and adaptation responses' and 'in commitments to equity and justice'. While not geared specifically towards universities, resources such as UNESCO's guide for schools on climate action (UNESCO, 2016) underline the importance of contextually relevant approaches to climate change education; similar evidence on the extent to which universities are addressing matters related to climate change are already emerging from a range of contexts (Leal Filho et al., 2021).

The climate change and higher education landscape as it has been described here has had an important effect on the socio-political institutional context in which universities operate (Maassen, 2014). The range of national and international actors involved in climate change and higher education have had to search for a new bargained agreement between themselves, while ensuring that such agreement fits with the aims of a just global future that takes into account the need for connected approaches to development. These connections need to occur across broader development and growth policies, as well as climate policies and education policies. The following part of the paper outlines our methodology, with a specific focus on the approach to documentary analysis applied in order to examine and understand the extent to which national policies in Brazil, Fiji and Kenya do or do not demonstrate this kind of connectedness in later sections.

4. Methodology of the review

The climate protocols, accords and frameworks detailed above have been intended to provide the essential building blocks for universal action to address climate change. However, much work has been and is still needed to breathe life into the provisions and commitments of these tools in order to realise the globally agreed vision to limit temperature rise, build the abilities of nations to adapt to climate impacts, and align national resources toward zero- carbon and climate-resilient development. To work with these tools, countries have attempted to root their national policies within frameworks like the 2015 Paris Agreement. Their national policy responses have specified the range of tasks and activities that need to be undertaken to elaborate and develop critical rules and processes in order to achieve the outcomes stipulated in policy, and do so by linking different sectors while managing the tensions between the respective priorities in these sectors.



To explore interlinkages between climate change policy and higher education policy this review draws on documentary analyses of policies, acts and agendas in Brazil, Fiji and Kenya, countries participating in the Climate-U (Transforming Universities for a Changing Climate) project. In each of the case studies, we focused on climate change and/or environmental policies, acts and agendas, educational policies, and in some cases broader policies or frameworks associated with 'development', 'sustainability' or 'green growth', exploring whether and how specific reference to climate change and/or higher education is made.

The comparative element of the paper offers the opportunity for cross-cultural learning, both in the development and language of policies around climate change and links to higher education. First, with reference to three country studies, this comparative case analysis aims to pay simultaneous attention to and across micro, meso and macro levels through an assessment of how climate change policies come into focus at these different levels. This allows a vertical examination of the ways in which climate change policies arise and are implemented. Vertical examinations of this nature consider how and to what extent decision-making actors are linked with non-decision-making actors who nonetheless have influence in policy processes, as well as how and to what extent decision-making actors are linked with the target groups that policies are aimed at. Second, the review compares how similar policies unfold in distinct locations that are socially produced and simultaneously and complexly connected. It does so through an exploration of how globalising policy processes on climate change and higher education intersect. Inter-sectoral linking addresses the tensions and trade-offs that exist across policy areas, and exploits the synergies between them. This aspect of the review provides a horizontal examination.

The overview of climate policies across micro (as local), meso (regional) and macro (global) levels will be followed by a cross-country analysis of the cases of Brazil, Fiji and Kenya to explore how national policies are (or are not) in dialogue with policy discourses around climate change. We thus consider that this global comparative policy review will be of use to inform future policy formation in the featured countries, but also more broadly for the twin aims of leveraging policy to enhance universities' capacity for responding to climate change, and raising the profile of educational institutions to contribute to policy processes.

Methodologically, each of the three cases began with a desk-based review of the content of different climate and education policies, to understand interlinkages and disconnections between them. Each of the policies was analysed by looking at whether and how climate change was framed in relation to higher education policies (and in some instances education policies more generally), and vice versa. **Table 1** (overleaf) summarises the number and type of policies which were used to support the national and comparative analysis of the three case studies.

This kind of view of the policy frameworks in each country at a glance allows us to establish the extent of policy thickness in each case. 'Thickness' refers to the mix of policy instruments (in terms of number and diversity of policies) required to address the multiple

barriers to, and drivers of, climate change transformation (Oberthür and von Homeyer, 2022 p. 2). This mix comprises substantive (regulatory, economic and informational instruments) and procedural policy instruments (i.e., delegation of decision-making, reporting, monitoring and reviewing). It must also be stated that other aspects such as public participation, durability/flexibility, mechanisms for revising the policy framework, innovation, and policy monitoring are important. These aspects must be systematically integrated into an overall assessment of the policy framework (Oberthür and von Homeyer, 2022).

In the next section we turn to the three cases of Brazil, Fiji and Kenya. Each case begins with a description of the national context, followed by an overview of national climate change policy frameworks. Finally, a description of how these policies articulate with policies for education institutions, and more specifically HEIs, is provided.

5. Three case studies of education and climate policy

Policy analyses in the field of climate change have previously examined processes of policy diffusion and convergence and explored how policy instruments are employed in climate policies (Albrecht and Arts, 2005). Others have looked more closely at how different actors are engaged in policy development, with some attention to the role that universities might play within this space, whether through direct co-created impact in which universities establish longstanding relationships with policy-makers (Wesselink and Gouldson, 2014; Taylor et al., 2016), or through universities acting as key facilitators of policy discussions at, for example, municipal levels, in which universities bring together a range of stakeholders around mitigation and/or adaptation planning and localised climate governance (Hillmer-Pegram et al., 2012; Iwami et al., 2020). Building on these studies, there is a pressing need to understand how policy relates to HEIs, and how HEIs participate in the implementation of policy.

This section discusses the substantive and procedural instruments outlined in the policy frameworks of Brazil, Fiji and Kenya. The cases presented here highlight the policy advances made in each of the countries under study. At the same time, the cases also highlight gaps in responses from the relevant national governments as well as their effects on the coherence of national policy frameworks. In terms of these effects, the cases are also consistent with the literature in section three, which finds that responses to climate change through governance, research, teaching and community engagement, are largely of a 'top-down' nature, and remain under-developed. The evidence from Brazil, Fiji and Kenya suggests that this leads to particular policy problems in each instance. They lead to the challenges of: policy porosity, policy vagueness and policy contradiction in the three cases respectively. This raises questions regarding the balance between forms of policy movement—transfer, borrowing, translation and learning—in each of these contexts.

Table 1: National Policies on Climate Change and Education in Brazil, Fiji and Kenya

Name of country	'Development' or 'growth' policies reviewed	Climate policies reviewed	Educational policies reviewed
Brazil		<ul style="list-style-type: none"> • - National Environment Policy (Brazil, 1981) • - National Plan on Climate Change (Brazil, 2007)¹ • - National Plan for Adaptation to Climate Change (Ordinance n° 150 Brazil, 2016; also known as the Brazilian Adaption Strategy) • - National Policy on Climate Change (Brazil, 2009) <p>¹ Brazil (2007). Decree n° 6.263, 21st November 2007. <i>Institui o Comitê Interministerial sobre Mudança do Clima - CIM, orienta a elaboração do Plano Nacional sobre Mudança do Clima, e dá outras providências.</i> [Establishes the Interministerial Committee on Climate Change - CIM, guides the preparation of the National Plan on Climate Change, and other measures]. Rescinded in 2020.</p>	<ul style="list-style-type: none"> • Guidelines and bases of national education (Brazil, 1996) • - National Environmental Education Policy (Brazil, 1999) • - National Curriculum Guidelines for Environmental Education (Brazil, 2012)
Fiji	<ul style="list-style-type: none"> • National Climate Change Policy (Government of Fiji, 2012) • - National Climate Change Policy (Government of Fiji, 2018) • Environmental Policies: • - National Environment Strategy (Government of Fiji, 1993) • - Environment Management Act (Government of Fiji, 2005) • - Green Growth Framework (Government of Fiji, 2014) • - Fiji National Biodiversity Strategy and Action Plan 2011-2020 (Government of Fiji, 2011) • - Fiji National Biodiversity Strategy and Action Plan 2020-2025 (Government of Fiji, 2020) • - Fiji 5- Year and 20-Year National Development Plan (Government of Fiji, 2017) 	<ul style="list-style-type: none"> • Climate Change Act (Government of Fiji, 2021) 	
Kenya	<ul style="list-style-type: none"> • - Kenya Vision 2030 (Republic of Kenya, 2007). • - National Energy Policy (Republic of Kenya, 2018). 	<ul style="list-style-type: none"> • - National Disaster Response Plan (Republic of Kenya, 2009). • - Environmental Management and Co-ordination Act, (Republic of Kenya, 1999, & 2015). • - National Climate Change Response Strategy (Republic of Kenya, 2010). • - National Environment Policy (Republic of Kenya, 2013). • - Climate Change Act (Republic of Kenya, 2016). • - National Policy on Climate Finance (Republic of Kenya, 2016). • - Green Economy Strategy and Implementation Plan 2016 – 2030. • - National Climate Change Framework Policy (Republic of Kenya, 2016). • - National Adaptation Plan 2015-2030. (Republic of Kenya, 2016). • - Climate Risk Management Framework for Kenya (Republic of Kenya, 2016). • - National Climate Change Action Plan 2018 – 2022. • - National Wildlife Strategy 2030 (Republic of Kenya, 2018). 	<ul style="list-style-type: none"> • - Basic Education Act (Republic of Kenya, 2013). • - National Education Sector Strategic Plan (NESSP) 2018-2022. • - Education for Sustainable Development (Republic of Kenya, 2017).



5.1 Brazil

Power has changed hands in the last few years in Brazil, leading to a sharp pendulum swing between left-wing and right-wing ideological positions. The effects have resulted in a relatively unstable climate change policy and education policy environment. The rise of a right-wing populist leader has impacted environmental policy in general and the climate agenda particularly. It also seems to have presented set-backs following some of the ground work that had taken place just a few years prior to the election of Jair Bolsonaro (who held office between 2019 - 2022). Two groups have been drastically affected by the former Brazilian regime's policies: indigenous groups and the scientific community. In terms of the former, the contestation of indigenous land rights has been the main trend. In terms of the latter, knowledge production was employed by the right-wing regime to create its own "truth" about deforestation data in the Amazon. The scope of this paper does not allow sufficient elaboration on these conditions; however, we acknowledge that they have likely contributed to the paucity of the Brazilian state's policy response to the climate crisis through education.

The political instability that has characterised the national context over the past few years, together with severe inequality, means that the work of the state in responding to climate change has been further complicated by intersections between climate change and inequality. The more complicated the intersection between climate change and inequality, the more time is required for the design, planning and implementation phases of policy intervention. In the Brazilian context, the development of legal instruments specifically focused on climate change is recent. The first initiatives were registered in the National Plan on Climate Change of 2007 (Brazil, 2007; this was rescinded in 2020) and in the National Policy on Climate Change of 2009 (Brazil, 2009), but it was only in the most recent National Plan for Adaptation to Climate Change (Brazil, 2016), that a national strategy focused on climate adaptation was presented. These instruments are discussed below.

Climate-related policies

The National Policy on Climate Change (Brazil, 2009) was established in 2009 as a voluntary commitment of Brazil to the UNFCCC, to reduce greenhouse gas emissions and deforestation. The guidelines of Brazil's National Policy on Climate Change are mainly focused on mitigation aspects, including reducing greenhouse gas emissions and increasing reforestation. In order to achieve these goals, some measures are highlighted as instruments of the policy, such as: fiscal and tax measures to reduce greenhouse gas emissions; reports, inventories and studies of greenhouse gas emissions and; dissemination, education and awareness of the population (Brazil, 2009).

Climate-related supporting instruments include the National Environment Policy (1981), the National Plan on Climate Change (2007) and the National Plan for Adaptation to Climate Change (2016), also known as the Brazilian Adaptation Strategy.

Framings of education in climate policy

This section is dedicated to exploring the framing of education within the National Policy on Climate Change, and the framing of climate within national educational policies (Guidelines and Bases of National Education, National Environmental Education Policy, and National Curriculum Guidelines for Environmental Education). Given that climate policy is a single sector in its own right, and education policy another, their integration within national policy frameworks is necessarily complex. This discussion demonstrates particularly the lack of horizontal integration between the climate change and education policy sectors in the Brazilian case.

When it comes to the educational aspects addressed by the National Policy on Climate Change, the document specifically refers to the promotion of education and training on climate change, as one of the guidelines to the policy implementation, highlighting the importance of "promoting the dissemination of information, education, training and public awareness of climate change" (Brazil, 2009, p.2).

Two other guidelines refer to related topics, such as scientific and technology studies, in combination with adaptation and mitigation strategies. The first one focuses on:

VI - the promotion and development of scientific-technological research, and the dissemination of technologies, processes and practices aimed at: a) mitigating climate change through the reduction of anthropogenic emissions (...); b) reducing uncertainties in future national and regional projections of climate change; c) identifying vulnerabilities and adopting appropriate adaptation measures. (...). (Brazil, 2009, p.2)

The second guideline stipulates the importance of cooperation for research:

X - the promotion of international cooperation at the bilateral, regional and multilateral levels for financing, training, development, transfer and dissemination of technologies and processes for the implementation of mitigation and adaptation actions, including scientific research, observation systematic and information exchange (Brazil, 2009, p.2).

Finally, these topics are also acknowledged as policy instruments as they are regarded as:

"XIV - measures of dissemination, education and awareness (...)" which facilitate "VIII - the development of lines of research by funding agencies" (Brazil, 2009, p.3)

considering that these lines of research are related to thematic research areas focusing on climate sciences.

The National Policy on Climate Change in Brazil does not explore in detail how the strategies addressing educational aspects (i.e., guidelines and instruments) should be carried out and its scope is unclear. Whether it would include training or pedagogical practices, or whether these educational measures could be included within the recommended practices for environmental

education is also unclear. In the definition of environmental education, according to the National Environment Policy (Brazil, 1981) and complemented by the National Environmental Education Policy (Brazil, 1999), it is considered that it should reach all levels of education, from kindergarten to higher education, as well as formal, non-formal and informal education. Specifically, the National Environment Policy indicates as a principle to be met: "X - environmental education at all levels of education, including community education, with the aim of enabling them to actively participate in the defence of the environment." (Brazil, 1981, p.1).

The role of educational institutions and academia is presented in the climate policies by means of contributions to the development and execution of climate change policies, plans, programmes and actions (Brazil, 2009). Although not mentioned explicitly, guidelines that refer to science, research and technology may represent the role of HEIs.

When it comes to financial resources to fund climate action, the document mentioned the role of funding agencies in supporting research, providing opportunities for calls in thematic areas related to climate adaptation and mitigation (Brazil, 2009). In this context, Law No. 12,114 of 2009 established the National Fund on Climate Change, which is expected to guarantee financial resources for projects aimed at climate change mitigation or adaptation in the national territory, and it defines that the application of resources from the fund could be allocated to educational activities such as capacity building and training and mobilization (Brazil, 2009).

As the National Policy on Climate Change approaches educational aspects superficially, the National Plan for Adaptation to Climate Change, launched more recently (Brazil, 2016), was also investigated. In this strategy, a certain focus is directed towards capacity building. The plan mentions the importance of "generating knowledge for diagnosis, monitoring and forecasting of impact and response" when it comes to the climate scenario (Brazil, 2016, p. 253). This training is also aimed at governmental and non-governmental actors and especially recognizes the value of universities and research institutions acting in technical training, such as in the training of the Brazilian Health System (SUS) professionals. Professional training includes contemplating the vision of the impacts of climate change on human health, in addition to training for disaster situations (Brazil, 2016). When it comes to vulnerable populations, the strategy defines the need for "social inclusion of the most vulnerable peoples, emphasizing training to generate autonomy in populations highly dependent on government subsidies" (Brazil, 2016, p. 162). Their inclusion is in order to train these populations, considering the case of riverside and extractive communities whose livelihoods often depend on weather conditions. Finally, it is also planned that farming families can be trained to "multiply the seeds and preserve the genetic heritage of food in the region" (Brazil, 2016, p. 30), which contributes to food security.

When it comes to learning opportunities, the promotion of learning about a new context and adapting to this possible new

context of a changing climate can be encouraged with a special focus on "inclusion in elementary and high school curricula of the principles of civil defence and protection" (Brazil, 2016, p. 92).

Finally, when it comes to awareness raising, the Brazilian Adaptation Strategy addresses the importance of encouraging the population to prepare and contribute to climate mitigation and adaptation. In particular, considering the context of many micro and small companies, the national strategy highlights the importance of raising awareness in this sector, seeking to promote the inclusion of climate adaptation and mitigation in their environmental agenda (Brazil, 2016).

When the framing of climate-related aspects is considered in national educational policies, the situation is similar, with general approaches mostly focused on environmental issues. The most prominent topics in Brazilian education policies are understanding the natural environment, natural sciences and their technologies, biodiversity, water and waste management, low carbon and neutral carbon economy, preservation of the culture of traditional and indigenous people, relationships between climate change and the current model of production, consumption, and social organization. Additionally, the policies include references to the need of considering climatic conditions in academic calendars.

The Guidelines and Bases of National Education include topics related to the environment, dealing with the natural and social environment, natural sciences and their technologies and knowledge of the physical and natural world. More specifically, the National Curriculum Guidelines for Environmental Education (Brazil, 2012) define that the curriculum planning and management of the educational institution should contribute to establishing relationships between climate change and models of production and consumption, therefore protecting communities and the environment (Brazil, 2012, p.6).

Gaps in education and climate policy framings

The government's overarching climate change policy framework is not detailed enough; nor is the approach to education as an instrument of action to respond to a changing climate, as seen in the details of the policy guidelines. As indicated by Pucci (2012), the National Policy on Climate Change supports national concerns about sustainability, but has guidelines with high levels of generalization.

Taking all policies into consideration, environmental education could be understood as a content that integrates school curricula, not necessarily as a specific discipline, but approached in a transversal way in the traditional disciplines of the curriculum. Over the years, the importance of themes working with environmental education is gaining relevance and today it is highlighted more clearly in national curriculum guidelines. While environmental education receives this attention by means of dedicated policies/plans, climate change education has a more incipient consideration. Recommendations for climate change education



within the National Policy on Climate Change are very superficial and do not directly address the issue. The two parts in which the term “Education” is mentioned in the text refer to policy guidelines and instruments, as follows:

Guideline XII – “promoting the dissemination of information, education, training and public awareness on climate change” and Instrument XIV – “dissemination, education and awareness measures” (Brazil, 2009. p 3).

It was in recent years that the topic of climate change started gaining ground in discussions and policies on education in Brazil. In fact, trying to address the observed gaps in the national legislation and educational practice, there is currently a law (Law 3.950/2021) under consideration to include climate change content in basic education curricula.

This discussion has demonstrated that Brazil’s approach to national policy climate change and education policy is largely ‘top-down’. By this we mean that a state elite plays the regulating role in the relations between various actors in the climate change and education policy space. Elites are individuals who have the ability to exert influence through social networks, social capital and strategic position within social structures (Liu, 2018). As shown in this discussion, there is also the problem of climate change and education policy porosity. We use the term porosity to mean that there appear to be large gaps in Brazil’s policy framework for climate change and higher education. While the focus of this review is on policy implementation, the multi-dimensional nature of the climate crisis and the intersectional inequalities arising therefrom require a comprehensive policy response that cuts across several ecological, social, educational and other areas. Key areas needing more attention in order to achieve policy implementation include the building of public acknowledgement and consensus around the depth of the climate change crisis. This may include dealing with politically controversial issues like community dislocation and increases in migration in order to ensure that policy delivery mechanisms are set up to support adaptation action. Below we move on to the case of Fiji.

5.2 Fiji

Fiji is at the forefront of the fight against climate change with the impact of climate change on small island developing states widely known and highly publicised. The island states are described as ‘sinking’ due to their severe vulnerability as sea levels rise. Similar to the case of Brazil, the Fijian government’s climate change policies focus on adaptation and mitigation. This discussion outlines how far Fiji has come regarding education, environment and climate change policies. Additionally worth considering is how narratives around island states may treat these states as helpless victims of an inevitably doomed end—indicating some degree of determinism. The ‘island-ness’ of Fiji, in addition to being ‘small’, makes it a ‘remote’ region. This isolation shapes policy settings, and policy design and implementation. According to Martin et al. (2018) precise topographic maps, historical records and land use patterns are difficult to access in the remote areas of island states

like Fiji. This makes for potential difficulty in establishing the nature and extent of the climate crisis. These factors shape the issues of climate change and education policy discussed here.

General policies on climate change

Fiji first launched the National Climate Change Policy (NCCP) in 2012 which served as an overarching policy instrument for climate change. With new information and scientific data released over the years, the NCCP was reviewed and updated to align with the latest information and conventions that addressed current issues of importance. The revised NCCP (Government of Fiji, 2018) is closely aligned to the 5-Year and 20-Year National Development Plan (Government of Fiji, 2017) and strives to progress towards the Sustainable Development Goals (SDGs). The NCCP (2018) is based on three central policy pillars: human-rights, gender-responsiveness and evidence-based research and policy. There are 25 objectives that are grouped under three headings: foundations, dimensions and pathways towards a national climate change response. The foundations of the 2018 NCCP are based on the international frameworks, national governance and stakeholders. The dimensions provide support through identifying risks, priorities and actions for climate change adaptation and mitigation and the strategic pathways are the enablers in the pursuit of sustainable and resilient development. These objectives are further expounded upon throughout Section 3 (pp 45-72). The NCCP (2018) is built on eight principles: sustainable wellbeing, inclusivity, social cohesion, partnership, agility, urgency, transparency, and communication and integrated learning. It uses a ‘woven’ approach to resilient development. The concept of weaving is an ancient art form that is an integral part of South Pacific culture. Weaving in this sense, means that individual strands when interconnected become stronger, thus ensuring stability, strength and durability (Lagi et al., 2023). The NCCP (2018) relies on the connections between its many contributing factors to define national resilience. Resilience to climate change is strengthened through improvements and reliance on human wellbeing, ecosystem health, and economic stability.

The other fundamental legislation on climate change that is guided by the National Climate Change Policy (2018) is the Climate Change Act (Government of Fiji, 2021). The Act was established to ensure a comprehensive response to climate change, provide guidelines and ensure efficient monitoring and evaluation of greenhouse gas emissions and related matters. The Climate Change Act was passed by the Parliament of the Republic of Fiji on 24th September 2021. The Act provides a legal framework that supports Fiji’s objectives for the SDGs, long-term climate targets, the net-zero emissions target and the commitment to protecting Fiji’s ecosystems. The Climate Change Act (2021) consists of 112 Clauses and Sections, divided into 17 Parts that reflect Fiji’s National Climate Change Policy (2018) and the 2015 Paris Agreement.

General policies on environment

In addition to the policies on climate change, Fiji has several policies and plans in place to protect Fiji’s unique environment

which guided and provided the necessary background for the creation of Fiji's climate change policies and the Climate Change Act. There are several policies on the environment, but this case study will focus on only five of these policies and plans.

One of the earliest of the national plans that focuses on the environment is the National Environment Strategy (Government of Fiji, 1993). It began as The National Environment Management Project (NEMP) funded by a Asian Development Bank technical assistance grant and managed by the Fiji Government Ministry of Housing and Urban Development's Environment Unit. To support the project, technical assistance was provided by the International Union for the Conservation of Nature (IUCN), The World Conservation Union, and in association with the company ESA Pty Ltd Australia from August 1990 to October 1992. The Fiji Government undertook this comprehensive review of Fiji's environment along with the management capabilities to formulate the National Environment Strategy (NES) as an objective of NEMP Report 16, in 1993. The NES provided a framework to tackle emerging environmental issues from a legal perspective and with appropriate administrative structures. This was expected to provide a firm foundation for the future.

The NES provided the first comprehensive review of environmental issues plaguing Fiji during that time. Information on Fiji's environment, including climate and natural disasters, land and freshwater ecosystems, forest management, marine ecosystems and biodiversity, coastal zone and terrestrial biodiversity are provided as baseline information to help formulate appropriate management plans. The NES was released a year after the United Nations Conference on Environment and Development in 1992 and mentions Fiji's participation and commitment to the Rio Declaration and the Framework Convention on Climate Change. The NES provides guidance to the Fiji Government on how to create committees for the sustainable development of Fijian natural resources. It also provides a recommendation to update current policies to reflect the global shift towards sustainability and environmental protection of resources.

Subsequently, the Government of Fiji established the Environment Management Act (EMA) in 2005, "for the protection of natural resources and for the control and management of developments, waste management and pollution control and for the establishment of a national environment council and for related matters." (Government of Fiji, 2005 p. 1). The EMA was passed in Parliament by the Acting President at the time, Ratu Joni Madraiwiwi, on 17th March 2005. The purposes of the EMA are listed in Section 3(2), and they include the following: "To apply the principles of sustainable use and development of natural resources; and to identify matters of national importance for the Fiji Islands as set out in subsection" (Government of Fiji, 2005, p 3).

Additionally, the Green Growth Framework of Fiji (2014) was created in response to the 2010-2014 Roadmap for Democracy and Sustainable Socio-Economic Development. Fiji was a part of the Third World Summit on Sustainable Development convened in Rio de Janeiro in June 2012. The vision for the Framework is

for a better Fiji for all. The implementation of the framework is supported by the eight Guiding Principles and ten Thematic Areas of the United Nation's SDGs. The Framework has been stated to be a 'living document' which is a tool to promote integrated and inclusive sustainable development at all levels, strengthening environmental resilience, driving social improvement, reducing poverty, enhancing economic growth, and building capacity to combat the adverse effects of climate change. Some critiques levelled against the SDGs are worth noting. These include, among other things, their neglect of inequalities in the international system. For instance, the distribution of interventions towards those in remote maritime islands.

Furthermore, the Government of Fiji created the Fiji National Biodiversity Strategy (NBSAP) and Action Plan 2020-2025 (2020), a national document recognized by Fiji's National Environment Council established under the Environment Management Act (2005). Before this document was released, Fiji had five other National Reports and two other NBSAPs as part of the commitment Fiji made in 1992 by signing the Convention of Biological Diversity (CBD) in Rio De Janeiro, Brazil. The Fiji NBSAP focuses on the protection of Fiji's distinctive biodiversity and ecosystem goods and services that support the national economy, livelihoods, and food security. The objectives of the CBD are tightly intertwined with the NBSAP. Fiji committed to the following three objectives, when they signed the CBD:

- i. Developing and implementing national strategies to conserve and use the components of biological diversity sustainably;
- ii. Integrating biodiversity policy into relevant sectoral or cross-sectoral plans, programmes and plans;
- iii. Monitoring and periodically reporting on the status of biodiversity in the environment.

In short, the NBSAP has national strategies and actions that the Government hopes will ensure Fiji's biodiversity loss is reduced and eventually halted.

Most recently, the Government of Fiji created the National Development Plan in 2017 as a means for "Transforming Fiji" towards a more progressive, vibrant, and inclusive society. It was created as a map for Fiji and for all Fijians to realize their full potential as a nation. The National Development Plan provides a detailed plan of action, with specific targets and policies that ensure the 5-Year Plan is aligned to the 20-Year Developmental Plan.

Framings of Education and Climate Policy

The National Climate Change Policy (2018) provides an extensive and comprehensive blueprint with regard to the different foundations, dimensions and strategic pathways towards national capacity development, sustainable financing and private sector transition and engagement (Government of Fiji, 2018). However, education and the roles of education institutions is mentioned briefly or in passing as part of Fiji's plans to achieve SDG 4 (ensuring inclusive and equitable quality education and promote lifelong learning



opportunities for all). It is not evident until the objectives of the policy are defined in Pathway 5: National Capacity Development; and Objective 5.2: "To invest strategically in human and technological capacity-building for climate-resilient development." (The Government of Fiji, 2018, p. 67). The strategies to achieve this objective involve increasing access and improving national curricula and relevant national university degrees and modules to develop a 'climate-ready' workforce. There is also mention of promoting partnerships and agreements between academia and research institutions to increase research and development funds to combat climate change. Additionally, emphasis is placed on achieving Pathway 7: Private Sector Transition and Engagement, Objective 7.3: "To create a climate-ready workforce and promote social entrepreneurship" (Government of Fiji, 2018, p. 72), and, according to Strategy 6, national institutions will be roped in to ensure curriculum and capacity-building programmes are developed to reflect advancements in climate research and to ensure a climate ready workforce.

Furthermore, the Climate Change Act (2021) discusses education as a means of meeting climate change obligations of state entities (Part 5). Under Sub-Section 25, Integration of climate change into curricula (1), the Minister for Education must ensure that evidence-based learning about climate change is integrated into a variety of subjects under the Fiji National Curriculum Framework. In addition, under (2), the Minister may also advise universities and tertiary institutions to integrate evidence-based learning about climate change into the curriculum. Unfortunately, educational institutions are not mentioned again in the Climate Change Act (2021), although it would be beneficial to expand on the roles of education institutions in climate change mitigation and adaptation.

Climate change is mentioned by the authors of the National Environment Strategy (1993) under the Land Use Planning. It is noted that the impact of climate change on Fiji's land was to be determined but even at that time, it was known that Fiji would be severely affected by global warming, sea-level rise and climate change in the near future. There were three recommendations provided which suggested initiating long term planning for resources that would be affected by climate change such as the sugar cane industry and the plantations along the drier side of the two main islands, Viti Levu and Vanua Levu and initiating coastal zone management plans to combat sea-level rise along coastal communities.

The National Environment Strategy (NES) mentions education in two places. The first mention of environmental education is in a flowchart showing how to improve public participation in the effective management of natural resources and successful operation of the NES. To improve environmental awareness, the NES suggests creating an environmental management curriculum at the tertiary level. The second mention is in the form of a project recommendation. Project 12: Upgrading Environmental Education - suggests improving the deficiencies within the current curriculum, providing in-service training to teachers and enhancing the resources needed to promote environmental education within schools. There are several activities listed in

achieving the objectives of the NES through the development of curriculum material on Fiji's terrestrial, ecosystem, and specifically forest environments as the most important. Reviews of the different subject areas and strengthening of the tools used to create awareness on environmental education are also mentioned, with mandatory workshops on environmental education for all teachers as the final activity.

Looking now at its linkages with education and climate change, unlike the National Environment Strategy, the Environment Management Act (2005) does not mention climate or climate change at all throughout. The Act barely mentions education aside from as part of the responsibilities of the Resource Management Unit (which has a focus solely on education and awareness).

Beyond this, there is no other mention of climate or education. The EMA (2005) provides guidance on: the establishment of a National Environment Council (Sections 7-8) with various functions such as approving the National Report; approving the NES; monitoring and overseeing the implementation of the NES; facilitating a forum to discuss environmental issues; making resolutions on public and private sectors' efforts on environmental issues; finally, ensuring Fiji's commitments to regional and international fora are implemented and advising Government on international conventions, treaties or agreements relating to the environment. The EMA (2005) also provides the guidelines on Environmental Impact Assessments (EIA), the Environmental Trust Fund and waste management and pollution control.

The guiding principle of the Green Growth Framework (2014) mainly focuses on the environment and sustainable development aspects. There is mention of the socio-cultural education of responsible environmental stewardship and civic responsibility, but it is not elaborated upon. This is as far as education features in the policy. However, climate change and its impacts on Fiji are mentioned extensively throughout the Framework document. The Green Growth Framework was created with the impact of climate change on sustainable development in mind. The first Thematic Area is listed as Building Resilience to Climate Change and Disasters. The chapter discusses the harsh impacts anticipated from climate change and associated extreme weather events in the future and the related challenges that Fiji faces. The status of existing policies and legislation related to climate change are discussed in detail with reference to the 1992 United Nations Framework Convention on Climate Change (UNFCCC), The Mauritius Strategy 2005-2015, Barbados Plan of Action 1994, and The Fijian National Climate Change Policy. The National Climate Change Policy (Government of Fiji, 2012) is built upon the UNFCCC which provides the backdrop for Fiji's Green Growth Framework. Natural disasters and their increasing intensities are a direct result of climate change and with Fiji's cyclone season, development in the country has been severely affected. The key challenges and proposed actions were listed with legislations, improved infrastructure, essential mitigation and adaptation measures and reinforced partnerships at all levels as the main points of interest. Finally, key indicators and trends expected such as increased annual temperatures, sea level rise projections and increased frequencies

of disaster events were discussed briefly. Unfortunately, education is not mentioned nor is the role of HEIs suggested as an avenue of improving development and creating awareness on the impacts of climate change on sustainable development.

Moreover, the Fiji Government placed great emphasis on integrating climate change strategies and commitments into the formation of the National Biodiversity Strategy and Action Plan 2020-2025 (NBSAP) as climate change is one of the main threats to biodiversity and livelihood. The NBSAP mentions that Fiji's commitments are outlined in several policies, namely the first National Climate Change Policy (2012) and the second (2018) which have provided guidance on the NBSAP. The initial NBSAP 2011-2020 (Government of Fiji, 2011) was revised to align with the Convention on Biological Diversity (CBD) Strategic Plan for Biodiversity 2011-2020 (CBD, 2010), which includes the Aichi Biodiversity Targets and Climate Change Adaptation Goals.

Of particular importance are the following Aichi Targets (CBD, 2010 p. 12):

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities and the poor and vulnerable.

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification. The Strategic Plan for Biodiversity can be used as a vehicle for achieving synergies at national level because actions to achieve Aichi Targets 10, 14 and 15 will contribute to climate change adaptation as well as biodiversity objectives.

The NBSAP 2020 discusses goals to achieve to ensure the strategy and action plan is successful. Fortunately, as part of Principle 7, improving knowledge, capacity and intellectual property, education and creating awareness are mentioned. As part of this Principle, there is agreement that "education, public awareness and local knowledge are essential for enabling the conservation of biodiversity" (Government of Fiji, 2011 p. 85). There are six focus areas to address in the 2020-2025 NBSAP; Focus Area 1 being Improving our Knowledge (IK). This Focus Area aligns with the CBD Strategic Goal A: Addressing the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society (CBD, 2010). There are several objectives to achieving NBSAP 2020-2025's Focus Area 1. One of the action plans includes

developing a NBSAP 2020-2025 communication strategy to guide national awareness and education programmes on conservation and sustainable use of biodiversity. Another action plan and probably the most powerful indication of education's role in biodiversity conservation, is within the section on Improving Knowledge, namely i) integrating traditional knowledge and practices in school curriculum to promote traditional values and practices for the protection and wise use of natural resources, and ii) including biodiversity conservation science and management in all primary and secondary school curriculum (Government of Fiji, 2020).

In contrast to the other legislation documents reviewed for this paper, it is noted that the NBSAP 2020 – 2025 suggests a full belief in the idea that empowering teaching institutions with updated knowledge and research is the best way forward to ensuring the conservation of Fiji's biodiversity. The principles, focus areas and action plans provide a robust guideline to achieving Fiji's goals and commitment to the CBD Strategic Plan for Biodiversity (CBD, 2010).

Regarding its linkages with education, the 5-Year and 20-Year National Development Plan (NDP; Government of Fiji, 2017), focuses heavily on the environment, education and climate as part of the detailed plan of action. As part of the 20-year development plan, the Government will ensure universal access to education at all levels with a focus on improving the quality of education. The Government plans to invest in improving existing and new education facilities, purchasing new equipment, embracing digital learning and improving teacher performance. The plan also ensures inclusivity for all types of learners. The 20-year plan also focuses on protecting culture, heritage, and natural environment by focusing on proper management of forests, mangroves and coral reefs. The National Development Targets from 2015-2036 focus on the SDGs with SDG 4 target indicators and SDG 13, 14 and 15 targets for the next six years.

Additionally, the 5-year national plans provide a more focused approach to quality education. The goals, policies and strategies are provided to ensure a clear pathway towards ensuring every Fijian student has equal access to education at all levels; enhancing the vocational, technical and lifelong skills training at all levels and strengthening support for higher education institutions. There are many programmes and projects suggested by the Government of Fiji with the end timeline being 2022. Furthermore, an emphasis is placed on sustainable management of fisheries and forestry resources with policies that focus on strengthening sustainable forest management, supporting inshore/coastal fisheries through sustainable fisheries management and development and growth of aquaculture industries. As part of the strengths and enabling environments, climate change is one of the major challenges faced by Fiji. The NDP emphasizes the role of Fiji as a steward of climate change issues at local, regional and global level with international collaboration and support in accessing climate finances and exploring innovative ways of mobilizing public and private sector resources for adaptation and mitigation.



Reflections on the gaps in education and climate policy framings

In summary, although the early climate and environmental legislation and plans provide sufficient background on Fiji's vulnerability to climate change and environmental degradation, they do not provide extensive strategies to incorporate the roles of higher education institutions, the Fiji National Curriculum Framework, and educational bodies in mitigating the impacts of climate change (Lagi et al., 2023). The National Environment Strategy (Government of Fiji, 1993) outlines the state of Fiji's resources, the issues faced, recommendations to improve the state of Fiji's resources and projects to be conducted in the future, but much of this will not take effect before the next decade when the objectives of the NES are implemented by the Fijian Government. Additionally, the Environment Management Act (Government of Fiji, 2005) does not discuss the important roles educational bodies have in creating awareness on the need for proper natural resource management and development. This gap in legislation could be amended by including the role of the Ministry of Education and HEIs in an amendment to the Act. However, with the advancements in technology, climate change research and climate change advocacy, improvements to Fiji's climate change and environmental legislations and policies can be seen. The Fiji National Climate Change Policy (Government of Fiji, 2012; 2018), Green Growth Framework (Government of Fiji, 2014), 5-Year and 20-Year National Development Plan (Government of Fiji, 2017) and the National Biodiversity Strategic Plan 2020-2025 (Government of Fiji, 2017), discuss in detail the roles and responsibilities of educational institutions in mitigating and combating the impacts of climate change which is a contrast to the Environment Management Act (Government of Fiji, 2005). Overall, Fiji needs to continue to ensure the roles of HEIs and educational bodies are not diminished or dismissed but are instead provided adequate funding and voice in any future amendments to the Climate Change Act (Government of Fiji, 2021) and National Climate Change Policy (Government of Fiji, 2018). Furthermore, platforms to advocate for climate change education are crucial and ought to be prioritized as they are instrumental in the policies and plans for climate change mitigation and adaptation. In this way, all important and relevant stakeholders are included in climate change and environmental policies. This will be a step in the right direction.

The Fiji case thus demonstrates an approach to national policy that is, like the Brazilian case, largely 'top-down'. In addition, Fijian climate change and education policies appear vague. This makes it hard to determine the credibility of such policies given the lack of comprehensive elaboration of what these climate change and education policies in fact entail in Fiji. Below we turn to the Kenyan case where the top-down problem features, too.

5.3 Kenya

The Global North has tended to emphasise the common responsibilities of all nations to reduce emissions. This is despite the fact that the African continent contributes only 2-3% of global

carbon emissions (UNFCCC, 2006). Unsurprisingly, some historical and current divisions exist in relation to the shared responsibilities of reducing emissions. Global North-South negotiating positions are derived from both this inequality in the historical and current emissions of greenhouse gases, as well as the geopolitical negotiating power between nation-states. The motives of the North, which have been associated with arrested development, are viewed with a suspicion that leads to scepticism about the ethics of global climate change governance. Kenya has made significant political and economic reforms that have contributed to sustained economic growth, social development, and political stability gains over the past decade. These gains have been made possible by the growing number and diversity of policies in a range of areas including climate change and education.

In Kenya, like in Brazil and Fiji, the government's climate change policies focus on adaptation and mitigation. Kenya's climate change policies draw from the Constitution of Kenya 2010 (hereafter referred to as *CoK*), specifically Article 42, which stipulates the right to a clean and healthy environment for all citizens (Republic of Kenya, 2010). Furthermore, Article 69, which comprises two parts, guides the state on its mandate of sustainably managing the environment. Article 69 stipulates that the state should oversee sustainable harnessing of natural resources, participation of communities in environmental conservation, increase of national tree cover to ten per cent, protection of genetic resources and indigenous knowledge used in biodiversity conservation (Republic of Kenya, 2010). The *CoK* provides spaces for formulating climate change legislation policies even though it does not precisely mention climate change.

In addition, pursuant to Article 2(5) of the *CoK* on general rules of international law, the constitution recognises principles of multinational law form part of Kenya's environmental and climate change jurisprudence (Republic of Kenya, 2010). International environmental and climate change laws have immensely contributed to the growth of Kenyan policies that address sustainability issues (Malowah and Oyier, 2022). Article 2(6) of the *CoK* allows the importation of international environmental treaties to form part of the domestic legal regime (International Federation of Red Cross and Red Crescent Societies, 2021). However, there have been several efforts by the Kenyan government to address climate change before the promulgation of the *CoK* 2010. These efforts include the ratification of the UNFCCC and Kyoto Protocol and the enactment of Vision 2030, and the Environmental Management and Coordination Act (EMCA) (Bellali et al., 2018). Climate change and education are multifaceted in Kenyan policies and framed using several expressions. A framing analysis of climate change and education in Kenyan policies reveals the alignment of the policies to the sustainable development agenda and gaps in implementing the guidelines.

Framing of climate change

The framing analysis is crucial in identifying and understanding latent and underlying realities of climate change in Kenyan policies. Various locutions such as smart agriculture, afforestation and

reforestation, early warning systems, taxations, funding, collective action, intergenerational equity and sustainable planning have been used to frame climate change mitigation and adaptations in the reviewed policies. Kenya's Vision 2030, National Climate Change Response Strategy (NCCRS), National Environment Policy (NEP) 2013 and the Green Economy Strategy and Implementation Plan (GESIP) 2016-2030 advocate for climate-smart agriculture (CSA) to address climate change in the country. Lipper et al. (2014) regard CSA as a sustainable approach to providing food supplies to an ever-growing population facing the threats of climate change. CSA championed by the policies entails promoting the expansion of irrigation schemes, eco-farming, and orphan crops programme to increase the production of indigenous drought-resistant crops. Specifically, Vision 2030 advocates for an innovative and commercial-oriented agriculture, fishery and livestock sector to increase food production (Government of Kenya, 2007). The blueprint and NEP 2013 champion rehabilitation and expansion of irrigation schemes to ensure that communities increase their farmland and productivity to address the challenges of drought and desertification (Government of Kenya, 2007; Republic of Kenya, 2013).

NEP 2013 states to strengthen CSA, there is a need to protect land, a finite, fragile and non-renewable resource (Republic of Kenya, 2013a). The policy calls for sustainable practices to ensure optimal land use and soil conservation to increase the resilience of the agricultural system against natural hazards of climate change. Sustainable land management practices are largely needed in the country's arid and semi-arid lands (ASALs) (Nkonya et al., 2018). Therefore, NEP 2013 notes that the government will implement an Integrated Water Resources Management (IWRM) in the ASALs to harvest flood and river water. The policy discerns that sustainable harnessing of natural resources, effective land and agricultural practices will play a significant role in helping ASALs communities mitigate and adapt to climate change.

The framing analysis reveals that EMCA, NCCRS, NEP 2013, the 2018 National Energy Policy, Climate Change Act 2016 and National Climate Change Action Plan (NCCAP) 2018-2022 call for participatory action to address climate change issues. The policies champion collaborative efforts from local administration, women's groups, youth, education institutions, lead agencies and the private sector in implementing sustainable practices. Collaborative implementation of environmental policies entails the definite formulation of specific national, sub-national, or cross-national plans and programmes (Newig and Koontz, 2014). The plans and programmes allow various stakeholders to assess the policy guidelines and develop measures and monitoring strategies for the set substantive objectives. The call for a collaborative approach to implementing the policies' guidelines is crucial in assisting stakeholders in recognising that climate change is a complex threat that requires sharing roles and resources to achieve sustainability (Newig and Koontz, 2014). Therefore, implementing the Kenyan policies that address climate change through a participatory approach allows the stakeholders to share responsibilities to meet the set targets.

Afforestation and reforestation are largely utilised in framing climate change mitigation and adaptations. Climate change-related policies state that stakeholders in the country must carry out practices such as afforestation and reforestation collaboratively. Vision 2030 set the goal of increasing the national tree cover to ten per cent through sustainable management of natural forests (Government of Kenya, 2007). The blueprint states that the country's five water towers should be rehabilitated and secure wildlife corridors and migratory areas through increasing vegetation cover. Protection of water catchments, religious and cultural sites and other fragile ecosystems through tree planting will increase the country's carbon sinks. The NCCAP 2018-2022 states that afforestation and reforestation should be carried out in all counties to rehabilitate degraded ecosystems (Government of Kenya, 2018). EMCA and NCCRS call for intensified and sustained afforestation and reforestation by lead agencies, the private sector, multilateral organisations, learning institutions and individuals (Republic of Kenya, 1999; Government of Kenya, 2010).

The National Disaster Response Plan 2009, NCCRS, NEP 2013, GESIP 2016-2030, National Climate Change Framework 2016 and NCCAP 2018-2022 recommend strengthening climate information dissemination through early warning systems. The policies discern that early warning systems are an ideal communication tool to disseminate timely information on potential occurrences of extremes of climate change like floods, droughts and heatwaves. Specifically, the National Disaster Response Plan 2009 notes that early warning systems should be mainstreamed into disaster risk management (Republic of Kenya, 2009). The National Climate Change Framework Policy 2016 states that Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs) generate well-grounded information to inform the public about their vulnerability to the extremes of climate change (Republic of Kenya, 2016a).

NCCRS and GESIP 2016-2030 guidelines dictate that stakeholders tasked with early warning systems of climate-related disasters should utilise local languages and knowledge understandable to the local communities (Government of Kenya, 2010 and 2016). The incorporation of indigenous knowledge in weather and seasonal forecasting and early warning systems is likely to encourage the uptake of the information among the local communities (Masinde, 2015). Furthermore, the NCCRS notes that early information on climate change-related information can be disseminated through print and electronic media using articles and programmes (Government of Kenya, 2010). Timely climate change-related information will play a significant role in helping communities evacuate from areas likely to experience climate change-related disasters.

Kenyan policies recognise that the pathway to addressing climate change must be based on sustainable practices. Individuals, private sector and government agencies operations and activities should have a foundational basis around the circular economy, clean production and industrial ecology approaches. EMCA directs the issuance of tax rebates to industries that engage in environmental-friendly practices and disincentives to firms engaging in harmful



environmental activities (Republic of Kenya, 1999). The NCCRS states that renewable energy technologies should be zero-rated to increase investment in clean and green energy that contributes to the reduction of the national carbon footprint (Government of Kenya, 2010). NCCRS, NEP 2013 and NCCAP acknowledge that planning and climate-resilient development are key in addressing climate change (Government of Kenya, 2010; Republic of Kenya, 2013a; Government of Kenya, 2018). The policies advocate proper planning of urban settlements to protect the fragile urban green spaces that are buffer zones to heatwaves, floods, and the urban heat island effect. NCCAP recognises that climate-proof coastal infrastructure will play a significant role in assisting the local communities in adapting to climate change impacts like sea-level rise and coastal flooding (Government of Kenya, 2018).

Adequate funding is crucial to ensure countries make meaningful progress towards climate action and sustainable development (Vorisek and Yu, 2020). Sound governance is a vital component of a productive climate financing mechanism. Therefore, Kenya has developed an effective enabling environment and a robust climate policy mechanism. Kenya has ratified the Paris Agreement and pledged its goals through the National Adaptation Plan (NAP) and NDCs (Odhengo et al., 2021). The country's commitment to the Paris Agreement is anchored in the Climate Change Act 2016. The act provides a sound regulatory framework for climate response and sets out a mechanism for setting up institutional arrangements to address climate change (Odhengo et al., 2021). The act provides a legal basis for establishing the National Climate Change Council headed by the president of Kenya, the National Climate Fund and the Climate Change Directorate (International Federation of Red Cross and Red Crescent Societies, 2021; Mallowah and Oyier, 2022).

The National Climate Fund is a financing mechanism to support priority areas and interventions for addressing climate change approved by the National Climate Change Council (Mbiru, 2020). As an outcome of the Climate Change Act 2016, the parliament enacted the National Policy on Climate Finance (Odhengo et al., 2021). The policy is regarded as a 'catalyst' toward the achievement of Vision 2030 and the alignment of climate financing to the nation's sustainable development agenda (Odhengo et al., 2021). The policy strengthens Kenya's capability to mobilise, track and soundly manage climate finances by mobilising funds that contribute to the attainment of low-carbon and climate resilient development (International Federation of Red Cross and Red Crescent Societies, 2021). Additionally, the policy establishes green bonds to sectors that lower their greenhouse gas emissions. NEP 2013 establishes a national carbon-trading platform and renewable energy trading certificate system (Republic of Kenya, 2013a). The NCCRS sets aside insurance schemes to conduct reparations to areas within the country hit by climate change (Government of Kenya, 2010). In addition, the strategy calls for the disbursement of grants to self-help groups that engage in environmental conservation.

Besides the Climate Change Act 2016, various policies set the establishment of institutional entities to carry out climate-related operations and activities. Mallowah and Oyier (2022) point out

that NEMA is a semi-autonomous government agency operating under the Ministry of Environment and Forestry. The primary role of NEMA is to provide general supervision to all environmental matters and implement environmental-related policies (Mallowah and Oyier, 2022). Furthermore, the act establishes the National Environment Tribunal that deals with appeals from discontented parties due to resolutions made by NEMA. The Climate Change Directorate, established by the Climate Change Act 2016, operates under the Ministry of Environment and Forestry. The Directorate is the lead agency that coordinates climate change activities in the country (Mbiru, 2020). The National Drought Management Authority Act of 2013 set the National Drought Management Authority (NDMA) (International Federation of Red Cross and Red Crescent Societies, 2021). The primary responsibility of the authority is to coordinate matters that relate to drought risk management.

Mbiru (2020) states that climate change activities in the country are a shared authority between the national and county governments. The Ministry of Environment and Forestry holds the authority and provides guidance on climate change governance. The ministry develops and reviews action plans, strategies and policies relating to climate change (Bellali et al., 2018). In addition, the ministry reviews and updates the NCCAP every five years and issues a biennial report to the national assembly on national and international obligations on climate change and progress towards a low-carbon economy (Bellali et al., 2018). The other ministries responsible for agriculture, livestock and fisheries, devolution and planning, energy and water, sanitation and irrigation implement specific sectoral planning and practices that strengthen climate action (Mutimba and Wanyoike, 2013; Bellali et al., 2018). The 47 county governments in Kenya are responsible for instituting climate change planning and budgeting at the devolved level to align with the Vision 2030, NAP, NDC and NCCAP (Deutsche Gesellschaft für Internationale Zusammenarbeit & UNDP, 2019). The Climate Change Act 2016 states each county government should mainstream NCCAP guidelines into the County Integrated Development Plan (CIDP) and sectoral plans (Republic of Kenya, 2016b). Further, the Act directs that each county government nominate a County Executive Committee (CEC) member to oversee climate change issues.

Kenyan climate change legislation recognises the need for sustainable development and intergenerational equity. The National Disaster Response Plan 2009 calls for mainstreaming climate change issues into national planning and development (Republic of Kenya, 2009). On the other hand, the EMCA states that developers should undertake EIAs to ascertain the positive and negative impact of development on the environment (Republic of Kenya, 1999). EIAs are a great pathway to attaining economic, environmental and social development equilibrium (Del Campo et al., 2020). The assessment tool allows various developmental stakeholders to share their opinions on approaches to support sustainable development in a rapidly expanding economy (Del Campo et al., 2020). The NCCRS promotes effective planning of urban areas to protect the populations from increasing climate-related disasters. NCCAP

2018-2022 champions sustainable infrastructure, protecting people against climate-related disasters. Specifically, the plan upholds the establishment of climate-proof infrastructure that can withstand damages of climate disasters, including flooding and rising temperatures (Government of Kenya, 2018).

Sustainable practices such as investing in nuclear power and other low-carbon technologies in the aviation and maritime sector are well stated in the National Climate Change Framework Policy, National Energy Policy and NCCAP 2018-2022. The National Policy on Climate Finance and GESIP 2016-2030 calls for revolutionising the vehicular transportation sector by utilising low-carbon technologies (Government of Kenya, 2016; Republic of Kenya, 2016d). GESIP 2016-2030 guidelines note that individuals and entities must increase their investment in green businesses with less ecological and carbon footprint (Government of Kenya, 2016). The aspect of intergenerational equity is largely used across all the climate change policies in Kenya to frame the importance of individual and collective climate actions. All the climate change legislations draw from the CoK 2010 Articles 42 and 69 that advocate for the sustainable harnessing of ecological resources within their regenerative capacity to ensure future generations will utilise the same resources to meet their demand. The policies note that there should be fairness in access and utilisation of natural resources among the present and future generations. In addition, the present generations should discontinue harmful practices that are harmful to the environment.

Framing of education

Climate change policies in Kenya are multifaceted, presenting various issues and images. Education is framed using various terms across the policies. Mbiru (2020) notes that the international community discerns that education is vital in helping nations transition to a low-carbon economy. Education is a robust tool that prepares communities to address global challenges presented by climate change (Halpaap et al., 2013). Education equips individuals and societies with knowledge, attitudes, values and skills to transit to green, low-carbon and climate-resilient societies (Halpaap et al., 2013). The Kenyan government holds an in-depth commitment to Education for Sustainable Development (ESD). The government discerns that implementing ESD is a crucial step toward creating an enabling environment to enhance teaching, research and implementation of sustainable development efforts (Mbiru, 2020). Moreover, education and climate change-related policies in Kenya recognise that educating citizens on climate change and environmental conservation issues is important in enhancing collective climate action.

The analysis of Kenyan education and climate change policies reveals that the education aspect is portrayed in several terms, such as climate change curricula, research, training, public awareness and promotion of indigenous knowledge. Vision 2030, NCCRS, National Adaption Policy (NAP) 2015-2030, National Climate Change Framework Policy and NCCAP 2018-2022 all champion mainstreaming climate change issues into the national curriculum. Specifically, National Environment Policy (NEP) 2013 stipulates

developing an examinable national environmental education curriculum at the basic, secondary and tertiary levels of learning (Republic of Kenya, 2013a). Climate Change Act 2016 Section 21 (1 & 2) states that the Kenya Institute of Curriculum Development, upon the advice of the National Climate Change Council, shall mainstream climate change concepts in several subjects and disciplines in the national curriculum (Republic of Kenya, 2016c). During the National Tree Planting Day in 2018, the president issued a decree for the Ministry of Education (MOE) and Ministry of Environment and Forestry to fast-track the mainstreaming of the climate change concepts as directed by the Climate Change Act (Mbiru, 2020).

Kenyan education policies also recognise the need to strengthen the national curriculum by mainstreaming climate change concepts. The Basic Education Act of 2013, Section 42 (4) directs that the MOE Cabinet Secretary, after the advice of the National Education Board, shall recommend to the government the importance of environmental education to ensure sustainable development (Republic of Kenya, 2013b). The NESSP 2018-2022 outlines two programmes: 1.5 (promote Education for Sustainable Development (ESD)), and 3.6 (Greening Technology in technical and vocational education and training - TVET), to strengthen the national curriculum in mainstreaming climate change concepts (Mbiru, 2020). Programme 1.5 calls for the formulation of an ESD action plan and capacity building for education managers to aid in integrating ESD and climate change education in all learning institutions (Ministry of Education, 2018). Additionally, the programme advocates an enhanced awareness of ESD among learners and learning institutions, as well as monitoring and evaluating ESD implementation in schools.

The Kenyan government launched an ESD policy in 2017 to provide a guide in the implementation of climate change learning (Mbiru, 2020). The policy applies to the national and county government addressing mainstreaming climate change in non-formal, formal and informal learning (Ministry of Education, 2017). Themes such as poverty alleviation, health, human rights, technologies, environmental conservation and their linkages to climate change issues are to be mainstreamed in the national curriculum as per the ESD policy guidelines. The learning content from the themes involves issues such as sustainable consumption and production patterns, gender equality, disaster risk reduction (DRR), biodiversity protection, poverty and climate change reduction measures. Developing climate change courses and infusing climate information into existing courses will significantly bridge climate literacy among learners at all levels of learning in Kenya. Students' exposure to climate information will likely increase understanding and awareness of the issue since learners are change-makers who positively inform communities (Muller and Wood, 2021).

Vulnerable and poor communities are most impacted by climate change-related disasters (International Federation of Red Cross and Red Crescent Societies, 2021). However, involving vulnerable and poor communities in climate action plays a significant role in keeping them informed and enhancing their resilience to climate



change impacts. EMCA 1999, NCCRS, NEP 2013, GESIP 2016-2030 and National Climate Change Framework Policy 2016 promote the use and recognition of indigenous knowledge to conserve the environment and develop locally-led climate change mitigation and adaptation (Republic of Kenya, 1999; Republic of Kenya, 2013b; Government of Kenya, 2016a; Republic of Kenya, 2016b). The policies discern that local communities hold traditional knowledge that they have relied on before to adapt to changing climatic systems. The ESD policy prescribes that MOE, National Commission for Science, Technology and Innovation (NACOSTI) and National Museums of Kenya advance the integration of indigenous knowledge in all learning levels (Mbiru, 2020). NCCRS stipulates inventorying of indigenous knowledge that the societies have used to cope with extreme climatic conditions to inform future generations (Government of Kenya, 2010). Furthermore, the policy recommends using indigenous knowledge to enhance research on sustainable development.

Kenyan education and climate change policies advocate for evidence-based scientific explorations. The scientific explorations should generate well-grounded practical and technological solutions to climate change issues. The EMCA, National Policy on Climate Finance of 2016, National Wildlife Strategy 2030, Climate Change Act 2016 and National Energy Policy 2018 state that institutions of higher learning, private sector and government lead agencies must carry out research on climate change-related issues (Republic of Kenya, 1999; 2016d and b; Republic of Kenya, 2018; Ministry of Energy, 2018). The government launched the Basic Education Curriculum Framework (BECF) 2017 as part of reforms in pre-primary education, primary education, secondary education, and inclusive education (Republic of Kenya, 2017). BECF aims to revolutionise research at all learning levels by instilling skills to learners to engage in scientific explorations in areas such as environmental protection and health (Mbiru, 2020). The Climate Change Act 2016 stipulates that research in academic, industrial, scientific, technological and policy fields should receive adequate grants to generate quality climate change investigations (Republic of Kenya, 2016b).

McCowan (2020) highlights five university modalities: campus operations, education, knowledge production, public debate and service delivery. Most education and climate change-related policies in Kenya promote campus operations, entailing sustainability planning investments. Henderson et al. (2017) highlight that there have been several efforts to reform campus operations through the adoption of low-carbon technologies. NESSP's Programme 3.6 calls for the adoption of greening activities such as waste management in technical and vocational education and training (TVET). TVETs are required to shift to environmental-friendly and renewable energy technologies such as biofuels, solar and wind (Ministry of Education, 2018). The NCCRS champions climate change-themed competitions that involve music, drama, poetry and essays among the students to expand climate literacy at the learning institutions (Government of Kenya, 2010). Campus operations championed by NCCRS and NESSP will provide learners with hands-on experiences in mitigating and adapting to climate change. Learners can replicate the campus operations

in their local communities to increase the scalability of sustainable climate action efforts.

Climate change awareness and perceptions vary across the globe due to the influences of various factors such as access to information, personal experiences with extreme weather and demographic factors such as level of education, age and gender (Ochieng, 2014). The factors may negatively influence people in Sub-Saharan Africa to develop a pervasive disinterest or a 'don't care attitude' toward climate change issues (Neondo, 2021). Climate scepticism in Sub-Saharan Africa exists despite overwhelming scientific evidence of climate change challenges in the region. Climate justice remains a topic of the 'converted' few activists and elites (Neondo, 2021). A study by Africa Talks Climate in ten Sub-Saharan African countries, including Kenya, reveals that people are poorly informed on climate change issues (Godfrey et al., 2010). Thus, Kenyan legislation on climate change acknowledges the importance of national awareness campaigns on climate change issues.

EMCA champions nationwide environmental education and public awareness to instil positive attitudes, beliefs and empower citizens to engage in sound environmental management (Republic of Kenya, 1999). National campaigns and public awareness are instrumental in helping realise the ramifications of unsustainable practices that increase ecological and carbon footprints. NCCRS promotes public awareness exercises that utilise a simplified language to communicate the science and impacts of climate change (Government of Kenya, 2010). The strategy discerns that simplified language during national campaigns and public awareness is crucial in helping the public, especially the rural communities, to be well informed on climate change issues. The policies state that the national campaigns and public awareness on climate change are a shared role between the Ministry of Education, small-medium enterprises, youth, women and the general community (Government of Kenya, 2007; Republic of Kenya, 2013a). Mangizvo et al. (2015) explain that the tripartite functions of teaching, research and community service strengthen education institutions' role in contributing to sustainable development. Education provides space for institutions to engage in public awareness through various community engagement initiatives (UNEP, 2008).

NCCRS champions the use of non-formal approaches to create climate change awareness, such as community eco-tournaments. Sporting events such as athletics and football pull a sizeable crowd suitable for mass training on climate change drivers, impacts, mitigations and adaptations (Government of Kenya, 2010). Sport is a fundamental right that holds the potential to change the world by strengthening communal ties that stimulate sustainable development. Climate Change Act 2016 and the National Adaptation Plan (NAP) 2015-2030 note that communities that have undergone capacity building and awareness on climate change should be empowered to inform other societies (Republic of Kenya, 2016c; Republic of Kenya, 2016e). In addition, the National Wildlife Strategy 2030 champions enhanced community extension and awareness activities and incentive programmes to ensure that

all citizens participate in informing each other and implementing sound environmental management practices (Ministry of Tourism and Wildlife, 2018). The National Climate Change Framework Policy 2016 and NCCAP 2018-2022 recommend establishing the National Climate Change Information Hub and National Climate Change Resource Centre, respectively (Republic of Kenya, 2016a; Government of Kenya, 2018). The two information centres will play a significant role in helping the citizens access well-grounded information on climate change issues and utilise it to inform others.

Gaps in the framing of climate change and education

Measures to address climate change are highly dependent on national government policies (Leal Filho and Vargas, 2021). Most environmental and climate change-related policies are conventional and primarily founded on 'top-down' approaches (Njoroge et al. 2017). Top-down approaches dictate the role of higher authorities in defining and guiding the implementation of policy guidelines at the community level leading to bureaucracy execution (Hill and Hupe, 2009). Njoroge et al. (2017) pinpoint that top-down approaches rely on the assumption aristocratic individuals and national groups can design, formulate and implement policies at the local level. In Kenya, higher authorities such as the government ministries, the Kenya Institute of Public Policy Research and Analysis (KIPPRA) and the legislative are tasked with broader policy issues that include design, formulation and spearheading the implementation (Konyango, 2019).

The foundation of Kenyan education and climate-change policies in top-down approaches violate the stipulations of Constitution Article 10 (National Values and Principles of Governance) and Article 27 (Equality and Freedom from Discrimination). The two Articles advocate for public participation, transparency and equal opportunities during national activities such as policy design, formulation and implementation (Konyango, 2019; Makena, 2019). Policies founded on a top-down approach limit the democratic space of local actors outside the higher authorities in a society (Cerna, 2013; Njoroge et al., 2017). Failure to involve all local actors in policy design and formulation hinders implementation (Njoroge et al., 2017; Konyango, 2019). Thus, the challenge of non-implementation of the education and climate change-related policies in Kenya can be largely traced to the top-down approaches.

Despite Kenya boasting progressive climate change legislations, their implementation is grossly inadequate. Policy recommendations such as mainstreaming climate change into all learning levels, national awareness campaigns and inventorying of indigenous knowledge have not been fully actualised. Huho (2015) points out that mainstreaming of climate change concepts in Kenya's primary and secondary learning levels is in a multidisciplinary approach. The concepts are taught in existing subjects such as social studies, agriculture, biology and geography, giving learners a limited understanding of climate change issues. The Kenyan education sector lags in mainstreaming or developing climate change-related courses at the basic, primary and tertiary

levels of learning despite recommendations from several policies (Huho, 2015). Kenyan universities have not mainstreamed climate change aspects into their curricula (Huho, 2015). Thus, the failure to implement a national environmental examinable curriculum and mainstream climate change aspects into the national curriculum limits climate literacy among learners and at the community level.

Ndua (2013) notes that there is a need to examine the top-down and bottom-up approaches during the discussion of policy implementation. Recognising policy failure, specifically the reason non-achievement occurs, plays a crucial role in searching for potential solutions (Hudson et al., 2018). Policy implementation failure or gaps occur when they are imposed with little attention given its design, formulation and implementation at the local level (Barrett and Fudge, 1981). Thus, a balance between the top-down and bottom-up approaches can greatly lead to policy formulation and implementation successes (Ndua, 2013). Makena (2019) further recommends a participatory approach by all local actors to eliminate the challenges of policy non-implementation. Higher authorities in Kenya, such as KIPPRA and Kenya Law Reform Commission (KLRC), must provide an opportunity for higher education institutions, communities and other stakeholders to be actively involved in policy design, formulation and implementation.

HEIs have the moral obligation to contribute to communal betterment by contributing to knowledge production, strong social ties and economic growth (Odhiambo, 2018). However, the role of universities does not receive adequate priority from global policy and research funding over the past few years (Kruss et al., 2015). In Kenya, although education and climate change policies recognise the role of education in informing learners, they fail to provide the specifics of the role of higher education in implementation. Nyerere et al. (2021) argue that the National Climate Change Framework of 2016 fails to provide clear guidelines on the role of higher education in the planning, creation and mainstreaming of climate change content. Policies are characterised by complexities that lead to a lack or inequitable distribution of responsibilities and uncertainties (Rossa-Roccor et al., 2021). Failure by the policies to clearly articulate the specific role and responsibilities of educational institutions in mainstreaming climate information leads to non-achievement.

The framing analysis of education and climate change in the policies reveals disjointed and contradictory guidelines. The Forest Policy of 2005 advocates for the sustainable commercialisation of charcoal (Government of Kenya, 2005). However, the policy fails to provide clear provisions of specific strategies to guide the commercialisation of charcoal production. Communities may fail to limit their exploitation of the ecological resources to engage in charcoal production leading to overexploitation of the resources within their regenerative capacity. The Forest Policy contradicts EMCA, NCCRS, NCCAP and Vision 2030, which advocate intensified afforestation and reforestation (Republic of Kenya, 1999; Government of Kenya, 2007; 2010 and 2018). In addition, the agricultural policies that address livestock issues contradict forest policy and other legislation by advocating for clearing trees in rangelands to stimulate grass growth (Ongugo



et al., 2014). Stakeholders discern the need to harmonise policies and strengthen institutions to address climate change effectively.

To summarise, this case, like those of Fiji and Brazil, demonstrates an approach to national climate change and education policies that is top-down. While in Brazil the policy framework seems porous and in Fiji vague, in Kenya we see issues relating to policy contradiction. These problems arise because the policy process in all three countries lacks a socially oriented approach. The social approach is underpinned by social partnerships that work to integrate exogenous elements (like international policy instruments) and endogenous elements (like inter-sectoral priorities, as well as different values, discourses and forms of knowledge including indigenous or traditional knowledge) to benefit recipient communities. Within this kind of approach, the role of facilitating actors that are able to mediate relations between diverse groups at the macro, meso and micro levels is essential. The discussions around these three cases reveal some of the opportunities for HEIs to play this kind of role. Yet these opportunities are not nearly exploited enough. In the absence of social approaches a limited degree of policy learning takes place and the traditional approach to policy implementation is perpetuated. Traditional policy implementation lacks this element of policy learning through concrete relational experiences that shape policies in relevant and responsive ways. We elaborate the implications of this and draw out our main conclusions in the discussion section below.

6. Discussion: what can we learn from these three cases?

As noted in the methodology section (4), a comparative approach was applied to analyse the three country studies. This allows a *vertical* and *horizontal* examination of the ways in which climate change and higher education policies arise and are implemented. Based on the three cases presented above, two main problems arise: the first is the lack of integration between the climate change sector and the higher education sector, as well as the lack of integration between the diverse values, forms of knowledge and discourses that can and ought to frame policies within each (horizontal integration); the second is the lack of integration between actors along different macro, meso and micro levels (vertical integration). A social approach to the policy-cycle is necessary in order to achieve better horizontal and vertical integration. This discussion describes the implications for the policy-cycle in each country when policy development and enactment are not sufficiently socially oriented. This first part of our discussion shows that horizontal integration is crucial in thickening the policy frameworks in each of the countries. The second part goes on to show that vertical integration is necessary in order to link traditional and non-traditional actors in the policy development and enactment process. Finally, we make the argument that actors like HEIs, together with other meso level actors, can play a facilitating role towards improved integration if adequately designated and embedded in policy development and enactment. We make this claim on the basis that they appear able, in the cases of Brazil, Fiji and Kenya, to garner the buy-in of traditional and non-traditional actors and can do so by mainstreaming climate change and higher

education policies in ways that draw on traditional, cultural and indigenous forms of knowledge.

To make our case, we reflect on three questions of relevance:

- 1) Who is involved in policy formation?
- 2) What is the content of policies? And,
- 3) What is the process through which policies translate into practices?

These questions help us to reflect on the opportunities that arise for innovative climate change and higher education policies. Our reflections touch on opportunities for innovation both with respect to procedural (i.e. delegation of decision-making, reporting, monitoring and reviewing) and substantive (regulatory, economic and informational instruments) policy innovation.

Although the preceding discussions highlighted the need for horizontal integration, not much was stated about the benefits of this kind of integration for policy cycles. We hence start by describing the reasons for which horizontal integration is necessary for effective policy formulation and implementation. Integration is about effectively addressing the tensions and trade-offs that exist across policy areas (in this case climate change and higher education), as well as exploiting the synergies between those areas. Horizontal integration therefore refers to the capacity of actors in different sectors to work together. The depth and complexity of climate change and higher education policy problems can only be addressed through blended approaches that allow the identification of the inter-sectoral problem through intelligence, allow the design of inter-sectoral policy formulations and prescriptions, their promotion and their appraisal. In the absence of this blended approach, uncomprehensive policy frameworks arise. Comprehensiveness is related to the 'thickness' or 'thinness' of policy frameworks as it requires a large enough and diverse enough number of policies to deal with the multi-dimensional nature of inter-sectoral policy problems.

Based on the reviews presented in the previous sections it can be concluded that the number and diversity of policies per case is generally limited, although this limited-ness differs significantly. In other words, each of the three countries sit on different points along the policy thickness-thinness continuum. Kenya appears to boast the most elaborate policy framework with the largest as well as the most diverse set of policies—17 in total, 14 of which are climate change policies, and 3 education policies. Brazil in contrast appears to have the least — 7 in total; 4 directly related to climate change and 3 to education. Further, of the three cases, Brazilian policies for climate change are some of the most under-developed. This could be because after the policies of the Fijian case, Brazil's policies are the most recently designed. And while it can be argued that Kenya's policy framework is thicker in nature than that of both Brazil and Fiji, it still presents problems to the extent that there remains a lack of blending between the intersectoral policy cycles. Relatedly, in all of the three cases rather superficial statements are made about the strategic instruments necessary in order to link climate change policy and higher education policy. For example,

in all the cases it seems that climate change education has a tendency to focus on one or other dimension of climate science and behaviour change, when the likely solution is probably more intricate and necessitates policy instruments that target multiple dimensions of the problem.

Next under discussion is the problem of vertical integration. Vertical integration is about linking decision-making actors (such as international development agencies and NGOs, as well as national governments and the private sector) with both non-decision-making actors (local civil society, social movements and religious or ethnic organisations) that nonetheless have strong links to the main target groups of policies and the target groups themselves. In other words, this kind of integration creates links between actors at different levels. The lack of vertical integration characterising the Brazil, Fiji and Kenya cases leads to the top-down problem found in each of the cases. Top-down approaches to policy formulation usually mean that the policy-cycle involves and is pushed by external (or international) development agencies and NGOs, the state, and the private sector. Such approaches fail to take seriously regional and local demands for climate change and higher education policies. These approaches also neglect the different knowledge forms held by excluded actors like activist groups and youth organizations, as well as local researchers and educators who will include university researchers and educators. We argue that because of poor horizontal and vertical integration, coherence between the macro, meso and micro scales of intervention is impeded to different degrees in each case.

The source of poor vertical integration tends to lie in the concentration of early-stage data development (for policy formulation) along the macro scale. The first point that we highlight is that although the characteristics of the integration problem differ per case, there is a striking similarity in that all cases place emphasis on the need for more evidence-based policy formulation. Few people would disagree that evidence is critical in the intelligence and prescription stages of the policy cycle. However, only experts are traditionally regarded as able to establish evidence. The category 'expert' reserves the right to knowledge production for actors along the macro scale, with formal institutional status in evidence-making organisations (for example, external development agencies or universities with a strong traditional research focus). Thus, knowledge co-production between a range of actors considered to be outside of the expert category is dismissed.

The role of education institutions as key knowledge co-producers with those traditionally not considered experts goes neglected in the policy statements made by the governments of Brazil, Fiji and Kenya. As shown, the National Policy on Climate Change in Brazil describes the role of research as critical and possible through the promotion of international cooperation at the bilateral, regional and multilateral levels for financing, training and development, as well as through the transfer and dissemination of technologies and processes for the implementation of mitigation and adaptation actions. This includes scientific research, observation and systematic information exchange. No significant mention is

made however of the role of non-traditional actors along the meso scales and micro scales (like researchers and teachers working in non-traditional universities) in these states' plans to develop a strong evidence base. The implication is a climate change and higher education policy framework in each instance with only a few, very broad policy statements centring the vertical sets of relations between the state and external development agencies. Furthermore, while the National Environmental Policy of Brazil has been in existence since the 1980s, as shown earlier, this policy focused broadly on the environmental sector. This focus on the environmental sector alone left gaps in horizontal integration with sectors beyond the environmental. However, Brazil's 2016 National Plan for Adaptation to Climate Change makes a pronouncement on the importance as well as the dimensions of evidence-based policy and action in a way that foregrounds knowledge production broadly. The National Plan for Adaptation to Climate Change recognises the need for capacity building in order to achieve: broad knowledge for the diagnosis, monitoring and forecasting of impact and responses to the climate crisis. This policy implicitly opens up the disciplinary focus of climate crisis responses, moving climate change and higher education policies beyond simply the environmental sciences which articulate linear, technically oriented notions of climate change solutions. This is because the environmental sciences are a technical discipline, based on linear causal models of climate change and adaptation strategies, with few links to the social and other disciplines related to environmental studies and the climate crisis.

In Fiji, a similar trend exists in relation to the evidence-base for policy formulation. The evidence based approach to meeting climate change and higher education obligations as stated in Fiji's policies does not express or emphasise the source of the evidence gap in Fiji, or the practical reality of how hard it could be to close this gap. The National Biodiversity Strategy and Action Plan (2020-2025) (NBSAP), as one example, suggests a full belief in the idea that empowering actors along the meso scale (like teaching institutions) with updated knowledge and research is the best way forward to ensuring the conservation of Fiji's biodiversity. Yet, this does not solve the difficulty of accessing remote island states. It seems obvious that in order to access the islands and close the data gap, collaboration with communities living in these parts is of critical importance in order to navigate Fiji. This may be especially true for the data gap in historical records of land use patterns. While communities may not have insights on land use patterns in documented form, they may be able to articulate these orally. The vertical integration between macro actors like the state and micro actors like communities can generate opportunities for the development of fuller data for areas of policy that are currently plagued by severe gaps. Linked to this is the need for a blended approach to establishing evidence. Traditional approaches are usually object-centred. In order to understand the climate crisis through the lenses of community members, person-centred approaches (which emphasise the perspective of actors along the micro scale) are also required under policies like the 2021 Fiji National Curriculum Framework. This blended object-centred and person-centred pedagogical approach can create a holistic evidence base, acknowledging the complementarities that can



arise when object-centred approaches meet person-centred ones which spotlight stand-point epistemologies.

The implications for the policy cycle, from these cases, are twofold. The first is that the lack of local and contextualized evidence increases the tendency of those driving policy formulation to make use of externally borrowed policies based on international bodies of evidence without adapting them to local needs. This is consistent with the hard form of policy transfer, rather than the soft. The second implication is that the policy cycle appears to get stuck in the intelligence phase (where evaluative information on the strength of policies is established), and perhaps the heavy emphasis on intelligence occurs because policy promotion and prescription are harder processes. Policy promotion and prescription require the buy-in of all those in the climate change and higher education sectors. This is only possible through the role of facilitating actors who are essential in mediating the relations between traditional and non-traditional actors. Their ability to play this role thus presents opportunities to disrupt old power hierarchies. The section that follows further analyses the facilitating role of actors like HEI which straddle the macro and meso scales.

Meso scale status is defined in relation to a specific macro and micro scale setting. In each of the three cases described here, meso scale actors appear, to a lesser or greater extent, to be somewhat disconnected from the levels both above (macro) and below (micro) them. Each of the three cases demonstrate that both in theory and in practice HEIs operate simultaneously along the macro and meso scales. At the macro level, education governance deals with education as a sector. Through this there should be a focus on how institutions of higher education interact with the state as well as with one another. As actors along the meso scale institutions of higher education deal with their internally organised structures where priorities have to be set, decisions made, budgets allocated, teaching programmes developed, and research achieved. The interface between macro and meso governance in HEIs gives rise to distinct approaches to research, teaching and service across different HEIs. It is also hence serves as a facilitating line for vertical integration.

Despite the interface between macro and meso governance in HEIs, in each of the cases of Brazil, Fiji and Kenya there is a lack of clear designation of these actors along the meso scale in policy frameworks. Their designation is necessary in order to embed HEIs in the policy-cycle in ways that achieve processes of engagement between all actors in the climate change and higher education sectors. This designation includes the expansion of their conventional activities and functions. Such activities or functions may be the identification and accessing of indigenous communities in new or innovative ways (for example through campaigns that make use of vernacular languages and challenge the mainstream language and discourse around climate change and higher education).

For each case, the context ought to determine the designation of meso scale actors like HEIs. This point can be elaborated using

the case of Kenya. Kenya's policies on climate change and higher education provide an example of poorly identified meso scale actors. For instance, the Basic Education Curriculum Framework (BECF) of 2017, notes the importance of reforms in pre-primary education, primary education, secondary education, and inclusive education (Republic of Kenya, 2017). But what is the role of HEIs in driving inclusive curriculum reform within each of these segments in the education system? Given that HEIs train teachers, their ability to contribute to teacher development ought to be foregrounded in climate change and higher education policies like the Climate Change Act of 2016, yet it is not. Not only this, but the education and training that teachers receive ought to be contextualised to take into account the inter-generational nature of climate change education.

The aims of the Kenyan Climate Change Act of 2016 were described in our discussion earlier as revolutionising research at all learning levels by instilling the skills in learners to engage in scientific explorations in environmental protection and health. Thus, the work of teachers needs to nurture the ability of learners to acquire research skills and co-produce knowledge with community members of diverse ages. The intergenerational nature of climate change makes it a complex intersection of co-occurring cultural, political, economic, historical, social, and medical changes and conditions. The youth can be critical in their role because of their ability to bridge discussions between people with insights into past, present, and future generations; diverse and complementary points of views; knowledge of various life course stages; and diverse values and priorities. Involving children and youth and adults in collaborative climate change discussions links youth's creativity for imagining a better world, adults' current capacities to implement change, and older adults' ability to refine plans based on what has worked (and not worked) in the past. We propose that these kinds of intergenerational engagements can further lead to vertically integrated, creative, equity-focused sustainability efforts which break through the siloed and short-term thinking that often permeates adult-driven sustainability policies. The implications of this kind of approach for the policy cycle are better opportunities for policy invocation and application. By way of this, policy movement can be more learning oriented rather than borrowing oriented, challenging old modes of policy transfer.

Similarly, the Fijian case shows the ability of certain meso scale actors to access the general public, creating opportunities for the invocation and application stages of the policy cycle. Much Fijian climate change awareness occurs through the media. Yet, one glaring gap in Fijian policies is that they overlook this highly publicised approach and the shaping power that this gives the media. The latter can be useful in building public support to accelerate climate mitigation, although it can also be used to do exactly the opposite and must hence be strategically managed. Generally, the media representation of climate science has increased and become more accurate over time. This serves as a soft power tool for the dissemination of scientific research that otherwise sits within the confines of HEIs. The dialogue generated by the public's consumption of media content reflects the meanings and values that they associate with the subject of climate change. If fed back

into HEIs this allows the mainstreaming of climate change and higher education policies. In addition, general approaches that appeal to the values of the public can be a catalysing force for the implementation phase of the policy cycle. Note that values also intersect with indigenous knowledges, horizontally integrating with traditional, cultural and recreational forms of knowledge.

Recreational forms of knowledge often go hand-in-hand with informal modes of education, which are advocated in climate change and higher education policies in Brazil, Fiji and Kenya. These include sporting activities (which may be initiated by communities or organisations in communities, together with HEIs). They serve as a tool to create public awareness in contexts like Kenya, where the National Climate Change Response Strategy policies aim to achieve grass roots climate action (Government of Kenya, 2010). Sports, like football, can form significant parts of certain national identities. Yet, in some of the country cases, the life-cycle of sporting equipment like a football and the need to recycle the material contents of the ball are poorly known to members of the public. Through the experiential learning process that arises from the action of recycling, a unifying sport like football can create awareness of the unity between the human race and the natural environment. It also contextualises the policy implementation process through participatory action so that local interests and priorities are centred. A participatory approach between all local actors is recommended in order to eliminate the challenges of policy non-implementation. Further, the larger the degree of participation, the broader the range of actors in a position to evaluate and appraise policies, offering up comprehensive sets of perspectives. This also presents opportunities to dismantle linear approaches to policy evaluation by allowing evaluation to begin at the site of policy implementation, and allowing participants' voices into the policy appraisal process immediately. In addition, this kind of process facilitates a more iterative approach to evaluation. Critical views state that higher authorities must provide an opportunity for HEIs and communities to play a role in developing informal learning approaches through recreational activities. These activities can include self-directed and asynchronous pedagogical approaches that allow participants to acquire and redefine climate change concepts organically.

The countries in question cannot formulate effective policy frameworks in the absence of a well thought out set of policy tools that take advantage of the power of meso scale actors with wide access to intergenerational groups as well as the general public at all levels, including grass roots. The lack of recognition of meso scale actors means that the critical resources that they require in order to further their facilitating roles are not directed towards them as much as they could or should be.

So far, we have described macro scale actors and action, as well as meso scale actors and action. In this final part of the discussion we focus on actors along the micro scale and the prospects they present for emancipatory policy formulation. In the case of Fiji, mention is made of the importance of taking into account the needs of women. Women are described as essential members of indigenous and local communities which are poor

and vulnerable. This is emphasized under the discussion on the National Biodiversity Strategy and Action Plan (2020-2025) – NBSAP - where Target 14 was elaborated (the target described climate change as one of the main threats to biodiversity and livelihood). Bringing the most marginalised into the policy cycle is crucial in order to achieve locally modified (recontextualised) policy-frameworks, which challenge existing structures, policies and practices (which are usually quite internalised). The intersectional vulnerability of women raises questions around the gender-differentiated impacts of climate change on women through the feminisation of vulnerability and the reinforcement of victimisation discourses, rather than emancipatory ones. In some instances, the limitations around climate change and higher education policies have not to do with the need for integration, but rather the wholesale replacement of certain power relations and discourses or ideas with others. Resistance to climate change adaptation (mal-adaptation) can be overcome through emancipatory discourses (which may replace victimization discourses). For instance, if the discourses within male dominated sectors are challenged, this may allow substantive changes in the processes of the policy cycle. While certain livelihood activities change or disappear for women as climate change occurs, new ones may arise. However, they will only do so if the discourses around women's work open up to allow the establishment of new job categories outside of the traditionally male. There are examples in Fiji of sub-projects focused on greening jobs like carpentry in order to educate and train women to construct disaster friendly and resilient homes. The role of HEIs could be to provide capacity support to sub-projects of this nature by integrating them into existing departments and feeding students into them either as a process of volunteering or as a requirement of their formal assessment. This has the ability to drive the policy invocation and application stages of the policy-cycle by contributing to micro institutional development which feeds back into meso institutional development as female carpenters begin to acquire a share in the informal or semi-formal markets for carpentry products and services.

7. Conclusion

These three cases have been critically analysed to generate new perspectives on the opportunities available for innovative, blended approaches to climate change and higher education policies. This is the first step in order to begin to move towards more bottom-up, reciprocal relations in climate change and higher education policy implementation. Policy implementation itself begins with the transformation of political wills. As a result, the distribution of power plays a central role in catalysing policy implementation in ways that disrupt exclusionary practices of the past, and embed facilitating actors in the policy cycle process (from the intelligence stage, through to the evaluation stage) in order to achieve effective policy outcomes. This has the ability to reshape the three elements of policy implementation: the first being to co-education of all actors affected by new policies; the second to change pre-existing administrative operations and systems (or create new ones); and the third to monitor and/or enforce the policy as needed.



From this we draw the lesson that establishing tools or structures for resource exchange, awareness creation, decision-making and follow-up is critical. Also critical is that this be done in a way that acknowledges the impact that institutions can have on individuals' actions and choices, stressing the influence of norms, culture and traditions in shaping collective priorities and behaviour. The cases of Brazil, Fiji and Kenya generate useful insights into the changing fabric of institutional arrangements in these countries, yet the rigidity of the vertical integration along which macro scale relations occur makes it difficult for new or innovative institutional arrangements to arise between macro, meso and micro actors.

This paper has demonstrated that a range of factors limit the scope for innovative policy processes in climate change and higher education policies. Neither simple ambition, nor stringency, capture whether a policy framework is designed to effectively address the breadth, depth, and complexity of the 'super-wicked' climate crisis. On the contrary, the effectiveness of policies is more complex. We conclude that the overarching value of the three cases is that they present an opportunity to conceptualise institutional arrangements in ways that embed new actors in the policy cycle process. Thus, policy formulation in each of the cases presented here should aim to integrate the knowledge, ideas and perspectives of the different sectors of society in a harmonious way. This necessitates inclusivity, and inclusivity itself requires a social approach to climate change and education policy interventions, where the focus is on socially oriented partnerships that work to integrate exogenous elements (like international policy instruments) and endogenous elements (like indigenous knowledge) to benefit recipient communities. We conclude that, in order to achieve this, discourses around climate change ought to centre the social by combining the technocratic interventions by states and development institutions with the resources that can be drawn from meso and micro scale actors. Approaches that centre the social rather than simply the technical require less ambiguity and less under-recognition of the facilitating role of higher education to contribute to policy development, implementation and action in this way.



Acknowledgments

This study forms part of the Transforming Universities for a Changing Climate (Climate-U) research project, funded by the Economic and Social Research Council as part of the Global Challenges Research Fund. The authors would like to thank Simon McGrath for his helpful comments on earlier drafts of this paper, and David Heymann and Kate Fox for their support in formatting and design.

References

- Albrecht, J. and Arts, B. (2005) Climate policy convergence in Europe: an assessment based on National Communications to the UNFCCC. *Journal of European Public Policy*, 12(5), pp. 885–902.
- Ansari, S., Wijen, F. and Gray, B. (2013). Constructing a climate change logic: an institutional perspective on the “tragedy of the commons”. *Organization Science*, 24(4), p. 1014.
- Antonio, R.J. and Clark, B. (2015) ‘The Climate Change Divide in Social Theory’, in Dunlap, R.E. and Brulle, R.J. (eds) *Climate Change and Society*. Oxford University Press, pp. 333–368.
- Averchenkova, A., Fankhauser, S. and Finnegan, J.J. (2021) The impact of strategic climate legislation: evidence from expert interviews on the UK Climate Change Act. *Climate Policy*, 21(2), pp. 251–263.
- Bacchi, C. and Goodwin, S. (2016) *Poststructural Policy Analysis*. New York: Palgrave Macmillan US.
- Ball, S. (1994) *Education Reform*. London: McGraw-Hill Education.
- Ball, S.J. (2012) *Global Education Inc.: New policy networks and the neo-liberal imaginary*. London: Routledge.
- Barrett, S. and L, Fudge. (1981). *Policy and Action*. London: Methuen.
- Bartlett, L. and Vavrus, F. (2014). Transversing the Vertical Case Study: A Methodological Approach to Studies of Educational Policy as Practice: Transversing the Vertical Case Study. *Anthropology & Education Quarterly*, 45(2), pp. 131–147.
- Bauer, M. et al. (2018). Sustainability Governance at Universities: Using a Governance Equalizer as a Research Heuristic. *Higher Education Policy*, 31(4), pp. 491–511.
- Bellali, J., Strauch, L., Oremo, F., and Ochieng, B. (2018). *Multi-Level Climate Governance in Kenya. Activating Mechanisms for Climate Action*. Adelphi/ILEG: Berlin.
- Benjamin, L. (2021). ‘International and Transnational Climate Change Law and Policies’, in *Companies and Climate Change*, pp. 78–112.
- Brazil (1981) Law nº 6.938, 31st August 1981. *Dispõe sobre a Política Nacional do Meio Ambiente, seus fins e mecanismos de formulação e aplicação, e dá outras providências*. [National Environment Policy, purposes and formulation and application mechanisms].
- Brazil (1996) Law nº 9.394, 20th December 1996. *Estabelece as diretrizes e bases da educação nacional*. [Guidelines and bases for national education].
- Brazil (1999) Law nº 9.795, 27th April 1999. *Dispõe sobre a educação ambiental, institui a Política Nacional de Educação Ambiental e dá outras providências* [National Environmental Education Policy]. Diário Oficial [da] República Federativa do Brasil, Brasília, DF, no 79, Seção 1, p.1-3, 28 Apr. 1999.



- Brazil (2007). Decree nº 6.263, 21st November 2007. *Institui o Comitê Interministerial sobre Mudança do Clima - CIM, orienta a elaboração do Plano Nacional sobre Mudança do Clima, e dá outras providências.* [Interministerial Committee on Climate Change – guiding preparation of the National Plan on Climate Change, and other measures].
Rescinded in 2020.
- Brazil (2009) Law nº 12.187, 29th December 2009. *Institui a Política Nacional sobre Mudança do Clima - PNMC e dá outras providências* [National Policy on Climate Change - PNMC and other measures].
- Brazil (2012) National Council of Education/Ministry of Education. Resolution nº 2, 15th June 2012. *Estabelece as Diretrizes Curriculares Nacionais para a Educação Ambiental* [National Curriculum Guidelines for Environmental Education].
- Brazil (2016) Ministry of the Environment (MMA). MMA Order 150 of 10th May 2016. National Adaptation Plan.
- Braun, A. et al. (2011) Taking context seriously: towards explaining policy enactments in the secondary school. *Discourse: Studies in the Cultural Politics of Education*, 32(4), pp. 585–596.
- Brüggemann, M. and Rödder, S. (2020). 'We are Climate Change: Climate Debates Between Transnational and Local Discourses.' in Brüggemann, M. and Rödder, S. (eds) *Global Warming in Local Discourses: How Communities around the World Make Sense of Climate Change*. Cambridge: Open Book Publishers.
- Burdett, N., & O'Donnell, S. (2016). Lost in translation? The challenges of educational policy borrowing. *Educational Research*, 58(2), 113–120.
- Capano, G., & Pritoni, A. (2020). Policy Cycle. In *The Palgrave Encyclopedia of Interest Groups, Lobbying and Public Affairs*. Springer.
- Cerna, L. (2013). The nature of policy change and implementation: A review of different theoretical approaches. Organisation for Economic Cooperation and Development (OECD) report, pp. 492–502. <https://www.semanticscholar.org/paper/The-Nature-of-Policy-Change-and-Implementation-%3A-A-Cerna/15d8a529d84b491b79d169aeabfbcb0532200971> (Accessed 6 September 2022).
- Chan, G., Stavins, R. and Ji, Z. (2018). International Climate Change Policy. *Annual Review of Resource Economics*, 10(1), pp. 335–360.
- Choudhary, B.K., Tripathi, A.K. and Rai, J. (2019) Can "poor" cities breathe? Responses to climate change in low-income countries. *Urban Climate*, 27, pp. 403–411.
- Crossley, M. (2019). Policy Transfer, Sustainability Development and the Contexts of Education. *Compare: A Journal of Comparative Education*, 49(2), 175–191.
- Convention on Biological Diversity (2010). Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets. <https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf> (Accessed 17 September 2024)
- Death, C. (2015). Four Discourses of the Green Economy in the Global South. *Third World Quarterly*, 36(12), 2207–2224.
- Del Campo, A. G., Gazzola, P., & Onyango, V. (2020). The mutualism of strategic environmental assessment and sustainable development goals. *Environmental Impact Assessment Review*, 82, 106383.
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), & United Nations Development Programme (UNDP) (2019). Multi-level governance and coordination under Kenya's national climate. https://transparency-partnership.net/system/files/document/200114_GPD_Kenya_RZ.pdf (Accessed: August 18, 2022).
- Dolowitz, D.P. and Marsh, D. (2000). Learning from Abroad: The Role of Policy Transfer in Contemporary Policy-Making. *Governance*, 13(1), pp. 5–23.
- Douglas, M. and Wildavsky, A. (1982). 'Introduction: Can We Know The Risks We Face?', in *Risk and Culture*. University of California Press, pp. 1–15.
- Evans, M. and Davies, J. (1999). Understanding policy transfer: A multi-level, multi-disciplinary perspective. *Public Administration*, 77(2), pp. 361–385.
- Evans, N. (2006). Natural resources and the environment in Fiji: a review of existing and proposed legislation. IWP-Pacific Technical Report, (21). https://www.sprep.org/att/publication/000525_IWP_PTR21.pdf (Accessed 22 September 2022).
- Everett, S. (2003). The Policy Cycle: Democratic Process or Rational Paradigm Revisted? *Australian Journal of Public Administration*, 62(2), 65–70.
- Facer, K. (2020). Beyond Business as Usual: Higher Education in the Era of Climate Change. Higher Education Policy Institute (HEPI) Debate Paper 24.
- Fahey, B.K. and Pralle, S.B. (2016). Governing Complexity: Recent Developments in Environmental Politics and Policy. *Policy Studies Journal*, 44, pp. S28–S49.
- Falkner, R. (2013) 'The Nation-State, International Society, and the Global Environment', in *The Handbook of Global Climate and Environment Policy*. John Wiley & Sons, Ltd, pp. 251–267.
- Feinstein, N.W. and Mach, K.J. (2020). Three roles for education in climate change adaptation. *Climate Policy*, 20(3), pp. 317–322.
- Filho, W.L. et al. (2019). Climate change scepticism at universities: A global study. *Sustainability (Switzerland)*, 11(10), pp. 1–13.
- Finnegan, J.J. (2019) *Institutions, climate change, and the foundations of long-term policymaking*. Preprint. Politics and International Relations.
- Fleming, A. et al. (2014) Challenging dominant discourses of climate change. *Climatic Change*, 127(3–4), pp. 407–418.

- Ford, J.D. et al. (2020). The Resilience of Indigenous Peoples to Environmental Change. *One Earth*, 2(6), pp. 532–543.
- Funtowicz, S. and Ravetz, J. (2020). 'Post-Normal Science: How Does It Resonate With the World of Today?', in Šucha, V. and Sienkiewicz, M. (eds) *Science for Policy Handbook*. Elsevier, pp. 14–18.
- Godfrey, A.; Le Roux-Rutledge, E.; Cooke, S.; Burton, M. (2010). *Africa Talks Climate: The Public Understanding of Climate Change in Ten Countries*; Department for International Development: London, UK.
- González, S.C. and Numer, E. (2020) *What is climate governance? A guide to understanding national climate governance and international climate negotiations*. UNICEF. <https://www.unicef.org/lac/media/19651/file/what-is-climate-governance.pdf> (Accessed 15 June 2022)
- Gough, A. (2020) *Educating Australia on the climate crisis*. Available at: <https://www.policyforum.net/educating-australia-on-the-climate-crisis/> (Accessed: 15 June 2022).
- Government of Fiji and IUCN-The World Conservation Union. (1993). The National Environment Strategy- Fiji. <http://macbio-pacific.info/wp-content/uploads/2017/08/National-Environment-Strategy.pdf> (Accessed on August 24th, 2022).
- Government of Fiji. (2005). Environment Management Act. <https://www.laws.gov.fj/Acts/DisplayAct/2576> (Accessed August 8th, 2022).
- Government of Fiji (2012). Republic of Fiji National Climate Change Policy. <https://www.refworld.org/policy/strategy/natlegbod/2012/en/121114> (Accessed August 8th 2022)
- Government of Fiji (2014). A Green Growth Framework for Fiji. Restoring the balance in development that is sustainable for our future. https://policy.asiapacificenergy.org/sites/default/files/Green%20Growth%20Framework%20for%20Fiji_16%20Sept%202014_LowRes%20%284%29.pdf (Accessed August 8th 2022)
- Government of Fiji (2017). 5-Year and 20-Year National Development Plan. Transforming Fiji. <https://policy.asiapacificenergy.org/sites/default/files/5-Year%20%26%2020-Year%20National%20Development%20Plan-%20Transforming%20Fiji.pdf> (Accessed December 6th, 2022).
- Government of Fiji. (2018). Republic of Fiji National Climate Change Policy (2018–2030). <https://www.economy.gov.fj/images/CCIC/uploads/General/FIJI-National-Climate-Change-Policy-2018-2030-FINAL.pdf> (Accessed December 6th, 2022).
- Government of Fiji (2020). National Biodiversity Strategy and Action Plan 2020–2025, Suva, Fiji. <https://www.mowe.gov.fj/wp-content/uploads/2020/06/National-Biodiversity-Strategy-Action-Plan.pdf> (Accessed December 6th, 2022).
- Government of Fiji. (2021). Fiji Climate Change Act. <http://www.parliament.gov.fj/wp-content/uploads/2021/08/Bill-31-Climate-Change-Bill-2021.pdf> (Accessed December 6th, 2022).
- Government of Kenya. (2005). Forest Policy. <https://www.nema.go.ke/images/Docs/Legislation%20and%20Policies/Forestry%20Policy.pdf> (Accessed August 16 2022).
- Government of Kenya. (2007). Kenya Vision 2030. The Popular Version. <http://vision2030.go.ke/wp-content/uploads/2018/05/Vision-2030-Popular-Version.pdf> (Accessed August 16 2022).
- Government of Kenya (2010). National Climate Change Response Strategy. <https://cdkn.org/sites/default/files/files/National-Climate-Change-Response-Strategy-April-2010.pdf> (Accessed August 16 2022).
- Government of Kenya. (2016). Green Economy Strategy and Implementation Plan 2016 – 2030. <https://faolex.fao.org/docs/pdf/ken170764.pdf> (Accessed: August 16 2022).
- Government of Kenya (2018). National Climate Change Action Plan 2018–2022. Ministry of Environment and Forestry, Nairobi. <https://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2018/10/8737.pdf> (Accessed: August 16 2022).
- Grist, N. (2008). Positioning climate change in sustainable development discourse. *Journal of International Development*, 20(6), pp. 783–803.
- Halpaap, A., Horstbrink, A., Mackay, A., & Abreu, D. (2013). Guidance note for developing a national climate change learning strategy: Strengthening human resources and skills to advance green, low emission and climate resilient development. United Nations Institute for Training and Research (UNITAR). https://www.unitar.org/sites/default/files/media/publication/doc/guidance_note_-_eng_0.pdf (Accessed 22 July 2022).
- Halsnæs, K. and Trærup, S. (2009). Development and Climate Change: A Mainstreaming Approach for Assessing Economic, Social, and Environmental Impacts of Adaptation Measures. *Environmental Management*, 43(5), pp. 765–778.
- Harlan, S.L. et al. (2015) 'Climate Justice and Inequality', in Dunlap, R.E. and Brulle, R.J. (eds) *Climate Change and Society*. Oxford University Press, pp. 127–163.
- Henderson, J.A., Bieler, A. and McKenzie, M. (2017). Climate Change and the Canadian Higher Education System: An Institutional Policy Analysis. *Canadian Journal of Higher Education*, 47(1), pp. 1–26.
- Hermans, L.M. and Cunningham, S.W. (2013). 'Actor Models for Policy Analysis', in Thissen, W.A.H. and Walker, W.E. (eds) *Public Policy Analysis: New Developments*. Boston, MA: Springer US (International Series in Operations Research & Management Science).
- Hill, M. & Hupe, P. 2009. *Implementing public policy*. Thousand Oaks, CA: Sage Publications.
- Hillmer-Pegram, K.C. et al. (2012). A geographic approach to facilitating local climate governance: From emissions inventories to mitigation planning. *Applied Geography*, 34, pp. 76–85.



- Hudson, B., Hunter, D., & Peckham, S. (2018). Policy failure and the policy-implementation gap: can policy support programs help? *Policy design and practice*, 2(1), 1-14.
- Huho, J. M. (2015). *Climate change knowledge gap in education system in Kenya*. Karatina University: Kenya.
- Hulme, M. (2009) *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*. Cambridge: Cambridge University Press.
- Hulme, R. (2005). Policy Transfer and the Internationalisation of Social Policy. *Social Policy and Society*, 4(4), pp. 417–425.
- International Federation of Red Cross and Red Crescent Societies. (2021). Law and Policies That Protect the Most Vulnerable Against Climate-Related Disaster Risks: Findings and Lessons Learned from Kenya. https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2021-07/Kenya%20DRR%20CCA%20Coherence%20Study-ONLINE.pdf (Accessed 22 July 2022).
- IPCC (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC: Geneva, Switzerland.
- IPCC (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC: Geneva, Switzerland.
- Iwami, A. et al. (2020). Organizing the Challenges Faced by Municipalities while Formulating Climate Change Adaptation Plans. *Sustainability*, 12(3), p. 1203.
- Katehi, L.P.B. (2012). 'A University Culture of Sustainability: Principle, Practice and Economic Driver', in Weber, L.E. and Duderstadt, J.J. (eds) *Global Sustainability and the Responsibilities of Universities*, pp. 117–128.
- Kautto, N., Trundle, A. and McEvoy, D. (2018). Climate adaptation planning in the higher education sector. *International Journal of Sustainability in Higher Education*, 19(7), pp. 1259–1278.
- Khan, M., Mfitumukiza, D. and Huq, S. (2020). Capacity building for implementation of nationally determined contributions under the Paris Agreement. *Climate Policy*, 20(4), pp. 499–510.
- Kruss, G., McGrath, S., Petersen, I.H., & Gastrow, W. (2015). Higher education and economic development: The importance of building technological capabilities. *International Journal of Educational Development*, 43: 22-31.
- Konyango, T. O. (2019). Influence of Governance on Public Policy Implementation in Kenya (*Doctoral dissertation, JKUAT-COHRED*).
- Læssøe, J. and Mochizuki, Y. (2015). Recent Trends in National Policy on Education for Sustainable Development and Climate Change Education. *Journal of Education for Sustainable Development*, 9(1), pp. 27–43.
- Leah Filho, W. & V. Vargas (2021). *The role and impact of the university: Universities facing Climate Change and Sustainability*. (pp. 38–52). Global Universities Leaders Council: Hamburg.
- Lagi, R., Waqailliti, L., Raisele, K., Sanchez Tyson, L. & Nussey, C. (2023) 'Curui': weaving climate justice and gender equality into Fijian educational policies and practices. *Comparative Education*, 59:2, 305-324.
- Lasswell, H. D. (1956). *The Decision Process: Seven Categories of Functional Analysis*. University of Maryland.
- Latour, B. (2005) *Reassembling the social: an introduction to actor-network-theory*. Oxford: Oxford University Press.
- Latter, B. and Capstick, S. (2021). Climate Emergency: UK Universities' Declarations and Their Role in Responding to Climate Change. *Frontiers in Sustainability*, 2(660596), pp. 1–8.
- Leal Filho, W. et al. (2017). Identifying and overcoming obstacles to the implementation of sustainable development at universities. *Journal of Integrative Environmental Sciences*, 14(1), pp. 93–108.
- Leal Filho, W. et al. (2021). 'Handling climate change education at universities: an overview. *Environmental Sciences Europe*, 33(1), p. 109.
- Lipper, L., Thornton, P., Campbell, B. M., Baedeker, T., Braimoh, A., Bwalya, M., Caron, P., Cattaneo, A., Garrity, D., Henry, K., Hottle, R., Jackson, L., Jarvis, A., Kossam, F., Mann, W., McCarthy, N., Meybeck, A., Neufeldt, H., Remington, T., Sen, T. P., Sessa, R., Shula, R., Tibu, A., & Torquebiau, E. F. (2014). Climate-smart agriculture for food security. *Nature climate change*, 4(12), 1068-1072.
- Luomi, M. (2020) *Global Climate Change Governance: the search for effectiveness and universality*. IISD Earth Negotiations Bulletin.
- Maassen, P. (2014). A New Social Contract for Higher Education? In Goastellec, G., Picard, F. (Ed.), *Higher Education in Societies*. (pp. 33–50). Sense Publishers.
- Makena, S. (2019, May 24). *Policy making process in Kenya: Get involved, it's your right and duty*. Kenya Climate Innovation Center (KCIC).
- Mallowah, S. & Oyier, C. (2022). Kenya. In C. Oyier (Ed.), *The Environment and Climate Change Law Review* (6th ed., pp. 69–80).
- Mangizvo, R. V., Chirume, S., & Mahlatini, P. J. (2015). Limited Awareness on Climate Change at the Zimbabwe Open University (Midlands Region): A Deterrent on Information Dissemination. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 2(5), 188–198.

- Masinde, M. (2015). An innovative drought early warning system for sub-Saharan Africa: Integrating modern and indigenous approaches. *African Journal of Science, Technology, Innovation and Development*, 7(1), 8-25.
- Mbiru, S. S. (2020, June). Background Report on National Climate Change Priorities and Relevant Capacity Development Goals and Initiatives in Kenya. <https://www.kenyaclimatedirectory.org/resources/64f2128d60b06#:~:text=Abstract%20%3A%20The%20country%20has%20put,a%20low%20carbon%20climate%20resilient> (Accessed 22 July 2022).
- McCowan, T. (2020) The impact of universities on climate change: a theoretical framework. *Transforming Universities for a Changing Climate Working Paper Series*, No. 1.
- McNeeley, S.M. and Lazrus, H. (2014). The Cultural Theory of Risk for Climate Change Adaptation. *Weather, Climate, and Society*, 6(4), pp. 506–519.
- Ministry of Education (2017). Education for Sustainable Development Policy for the Education Sector. Republic of Kenya. <https://www.education.go.ke/sites/default/files/2022-05/Education-for-Sustainable-Development-Policy-for-the-Education-Sector.pdf> (Accessed 22 July 2022).
- Ministry of Education (2018). National Education Sector Strategic Plan 2018–2022. Republic of Kenya. [https://www.education.go.ke/sites/default/files/Docs/MOE-NESSP%20BOOKLET%20TEXT%20combined%20%20with%20cover%202019%20\(1\).pdf](https://www.education.go.ke/sites/default/files/Docs/MOE-NESSP%20BOOKLET%20TEXT%20combined%20%20with%20cover%202019%20(1).pdf) (Accessed 22 July 2022).
- Ministry of Energy (2018). National Energy Policy. Republic of Kenya. <https://repository.kippra.or.ke/handle/123456789/1947> (Accessed 22 July 2022).
- Ministry of Tourism and Wildlife (2018). National Wildlife Strategy 2030. Abridged Version. Blueprint to transform wildlife conservation in Kenya. Nairobi, Kenya. <https://www.tourism.go.ke/wp-content/uploads/2018/06/WILDLIFE-STRATEGY2030-Final-V1-Online.pdf> (Accessed 6 September 2022).
- Molthan–Hill, P. et al. (2021). ‘Climate Change Education at Universities: Relevance and Strategies for Every Discipline’, In Lackner, M., Sajjadi, B., and Chen, W.-Y. (eds) *Handbook of Climate Change Mitigation and Adaptation*. New York, NY: Springer, pp. 1–64.
- Moran, E. (2010). ‘Environmental Decision Making’, in *Environmental Social Science: Human–Environment Interactions and Sustainability*. John Wiley & Sons, Ltd, pp. 126–142.
- Mukhtarov, F. (2012). Rethinking the Travel of Ideas: Policy Translation in the Water Sector. *Policy and Politics*, 1018.
- Muller, I., & Wood, L. (2021). Raising Awareness of Agency to Address Climate Change: The Do One Thing (DOT) Strategy. *Educational Research for Social Change* 10, no. 2 (2021): 47–62.
- Mutimba, S., & Wanyoike, R. (2013). Towards a coherent and cost-effective policy response to climate change in Kenya: Country report. https://ke.boell.org/sites/default/files/towards_a_coherent_and_cost_effective_policy_response_to_climate_change_in_kenya.pdf (Accessed 22 July 2022).
- Ndua, D. C. (2013). *Challenges facing the implementation of policies in the culture Sector in Kenya*. Doctoral dissertation, University of Nairobi.
- Nachmany, M., Byrnes, R. and Surminski, S. (2019). *National laws and policies on climate change adaptation: a global review*. Grantham Research Institute on Climate Change and Centre for Climate Change Economics and Policy. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2019/12/National-laws-and-policies-on-climate-change-adaptation_A-global-review.pdf. (Accessed 5 May 2022).
- Neondo, H. H. (2021). Framing of Climate Change Stories Covered by The Kenyan Daily Nation and The People Daily Newspapers. *International Journal of Science and Business*, 5(1), 67–81.
- Needham, C. (2011). ‘From policy transfer to policy translation: the role of evidence in policy borrowing’, in Glasby, J. (ed.) *Evidence, policy and practice: Critical perspectives in health and social care*. 1st edn. Bristol University Press.
- Newig, J., & Koontz, T. M. (2014). Multi-level governance, policy implementation and participation: the EU’s mandated participatory planning approach to implementing environmental policy. *Journal of European public policy*, 21(2), 248–267.
- Nelson, H.T. et al. (2015). Intergovernmental climate change mitigation policies: Theory and outcomes. *Journal of Public Policy*, 35(1), pp. 97–136.
- Nikas, A., Doukas, H. and Papandreou, A. (2019). ‘A Detailed Overview and Consistent Classification of Climate-Economy Models’, in *Understanding Risks and Uncertainties in Energy and Climate Policy: Multidisciplinary Methods and Tools for a Low Carbon Society*. Springer.
- Njoroge, J. M., Ratter, B. M., & Atieno, L. (2017). Climate change policy-making process in Kenya: deliberative inclusionary processes in play. *International Journal of Climate Change Strategies and Management*, 9(4), 535–554
- Nkonya, E., Minnick, A., Ng’ang’a, E., & Woelcke, J. (2018). Land and natural resources degradation in the arid and semi-arid lands. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/461701571216895387/Land-and-Natural-Resource-Degradation-in-Arid-and-Semi-Arid-Lands-in-Kenya> (Accessed 4 November 2022).
- Nussey, C., Sanchez Tyson, L., Dandare, K., Perry, J. and McCowan, T. (2023). How are universities responding to the challenges of climate change? A systematic review of literature. *Transforming Universities for a Changing Climate working paper series*.



- Nyerere, J., Gatwiri, W., & Okinyi, R. (2021). Kenya's climate change policy actions and the response of higher education. *Transforming Universities for a Changing Climate working paper series*.
- Odhengo, P., Korir, H., Muthini, D. & Moturi, W. (2021). The Landscape of Climate Finance in Kenya: On the road to implementing Kenya's NDC. <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/03/The-Landscape-of-Climate-Finance-in-Kenya.pdf> (Accessed 29 May 2022).
- Odhiambo, G. (2018, December). The role of Kenyan universities in national development. In FIRE: *Forum for International Research in Education* (Vol. 4, No. 3).
- Ongugo, P. O., Langat, D., Oeba, V. O., Kimondo, J. M., Owuor, B., Njuguna, J., Okwaro, G., & Russell, A. J. (2014). A review of Kenya's national policies relevant to climate change adaptation and mitigation: Insights from Mount Elgon. <https://www.cifor-icraf.org/knowledge/publication/5332/> (Accessed 15 June 2022).
- Oppenheimer, M. et al. (2014) 'Emergent Risks and Key Vulnerabilities', pp. 1039–1099. https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap19_FINAL.pdf (Accessed 23 October 2022).
- O'Reilly, J. et al. (2020). Climate Change: Expanding Anthropological Possibilities. *Annual Review of Anthropology*, 49(1), pp. 13–29.
- Perry, L.B. and Tor, G. (2008). Understanding educational transfer: theoretical perspectives and conceptual frameworks. *PROSPECTS*, 38(4), pp. 509–526.
- Petzold, J. et al. (2020). Indigenous knowledge on climate change adaptation: a global evidence map of academic literature. *Environmental Research Letters*, 15(11), p. 113007.
- Phelan, L. and Lumb, M. (2021). Higher education for times of climate crisis – critical awareness, purpose and community. *International Studies in Sociology of Education*, 30(1–2), pp. 173–190.
- Phillips, D. and Ochs, K. (2003). Processes of Policy Borrowing in Education: some explanatory and analytical devices. *Comparative Education*, 39(4), pp. 451–461.
- Raffe, D. (2011). Policy Borrowing or Policy Learning? How (Not) to Improve Education Systems (Brief 57). <https://www.ces.ed.ac.uk/PDF%20Files/Brief057.pdf> (Accessed 5 November 2022).
- Raffe, D., & Spours, K. (2007). *Three Models of Policy Learning and Policy-Making in 14-19 Education*. https://discovery.ucl.ac.uk/id/eprint/1541871/1/Spours_Raffe_2008Ch1.pdf (Accessed 28 January 2022).
- Rappaport, A. and Creighton, S. (2007). *Degrees That Matter: Climate Change and the University*.
- Reimers, F.M. (2021). 'The Role of Universities Building an Ecosystem of Climate Change Education', in Reimers, F.M. (ed.) *Education and Climate Change*. Springer, pp. 1–44.
- Republic of Kenya. (1999). Environmental Management and Coordination Act. https://eregulations.invest.go.ke/media/emca_1.pdf (Accessed 3 May 2022).
- Republic of Kenya. (2009). National Disaster Response Plan. <http://libraryir.parliament.go.ke/bitstream/handle/123456789/4318/National%20Disaster%20Response%20Plan.pdf?sequence=1&isAllowed=y> (Accessed 3 May 2022).
- Republic of Kenya. (2010). The constitution of Kenya 2010. Kenya Law. <http://kenyalaw.org/lex/actview.xql?actid=Const2010> (Accessed 5 July 2022).
- Republic of Kenya. (2013a). National Environment Policy, 2013. https://climate-laws.org/document/national-environment-policy-2013_4e63 (Accessed 5 July 2022).
- Republic of Kenya. (2013b). The Basic Education Act, 2013. http://www.parliament.go.ke/sites/default/files/2017-05/BasicEducationActNo_14of2013.pdf (Accessed 5 July 2022).
- Republic of Kenya. (2016a). National Climate Change Framework Policy. <https://www.undp.org/sites/g/files/zskgke326/files/migration/>
- Republic of Kenya. (2016b). The Climate Change Act, 2016. <http://kenyalaw.org:8181/exist/rest/db/kenyalaw/Kenya/Legislation/English/Acts%20and%20Regulations/C/Climate%20Change%20Act%20-%20No.%2011%20of%202016/docs/ClimateChangeAct1of2016.pdf> (Accessed 5 July 2022).
- Republic of Kenya. (2016c). A Climate Risk Management Framework for Kenya. https://cdn.climatepolicyradar.org/navigator/KEN/2016/a-climate-risk-management-framework-for-kenya_276d26febaa450e288a6a539bb63df2.pdf (Accessed: 5 July 2022).
- Republic of Kenya. (2016d). National Policy on Climate Finance. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC190011/> (Accessed 5 July 2022).
- Republic of Kenya. (2016e). Kenya National Adaption Plan 2015 – 2030. https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Kenya_NAP_Final.pdf (Accessed 5 July 2022).
- Republic of Kenya. (2017). Basic Education Curriculum Framework. <https://kicd.ac.ke/wp-content/uploads/2017/10/CURRICULUMFRAMEWORK.pdf> (Accessed 5 July 2022).
- Republic of Kenya. (2018). National Wildlife Strategy 2030. <https://www.tourism.go.ke/wp-content/uploads/2018/06/WILDLIFE-STRATEGY2030-Final-V1-Online.pdf> (Accessed 5 July 2022).
- Rizvi, F. and Lingard, B. (2009) *Globalizing Education Policy*. London: Routledge.
- Rossa-Roccor, V., Giang, A., & Kershaw, P. (2021). Framing climate change as a human health issue: enough to tip the scale in climate policy? *The Lancet Planetary Health*, 5(8), e553–e559.

- SDSN Australia/Pacific (2017) *Getting started with the SDGs in universities: A guide for universities, higher education institutions, and the academic sector*. Sustainable Development Solutions Network (SDSN). https://ap-unsdsn.org/wp-content/uploads/University-SDG-Guide_web.pdf (Accessed 3 October 2022).
- Shawoo, Z. and Thornton, T.F. (2019). The UN local communities and Indigenous peoples' platform: A traditional ecological knowledge-based evaluation. *Wiley Interdisciplinary Reviews: Climate Change*, 10(3), p. e575.
- Smith, A. (2004). Policy transfer in the development of UK climate policy. *Policy and Politics*, 32(1), pp. 79–93.
- de Sousa Santos, B. (ed.) (2008) *Another knowledge is possible: beyond Northern epistemologies*. London: Verso (Reinventing Social Emancipation: Toward New Manifestos, Volume 3).
- Steiner-Khamsi, G. and Waldow, F. (eds) (2012) *World Yearbook of Education 2012: Policy Borrowing and Lending in Education*. Routledge.
- Taconet, N., Méjean, A. and Guivarch, C. (2020). Influence of climate change impacts and mitigation costs on inequality between countries. *Climatic Change*, 160(1), pp. 15–34.
- Taylor, C. et al. (2016). Evaluating the outcomes and processes of a research-action partnership: The need for continuous reflective evaluation. *Bothalia*, 46(2).
- Thompson, M. (2003). Cultural Theory, Climate Change and Clumsiness. *Economic and Political Weekly*, 38(48), pp. 5107–5112.
- UNEP (2008). Mainstreaming Environment and Sustainability in African universities partnership 2004 - 2008 report. UNEP <https://www.unep.org/resources/publication/mainstreaming-environment-and-sustainability-african-universities-partnership> (Accessed: July 5, 2022).
- UNESCO (2016) *Getting climate-ready: a guide for schools on climate action*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000246740> (Accessed: 1 June 2022).
- UNESCO (2018) *Progress on education for sustainable development and global citizenship education: findings of the 6th Consultation on the implementation of the 1974 Recommendation concerning Education for International Understanding, Co-operation and Peace and Education Relating to Human Rights and Fundamental Freedoms (2012–2016)*. UNESCO Digital Library. <https://unesdoc.unesco.org/ark:/48223/pf0000266176> (Accessed: 15 June 2022).
- UNESCO (2019a) *Educational content up close: examining the learning dimensions of Education for Sustainable Development and Global Citizenship Education*. UNESCO Digital Library. <https://unesdoc.unesco.org/ark:/48223/pf0000372327> (Accessed: 15 June 2022).
- UNESCO (2019b) *Framework for the implementation of Education for Sustainable Development (ESD) beyond 2019*. <https://unesdoc.unesco.org/ark:/48223/pf0000370215?posInSet=3&queryId=193a9aaa-7167-4d98-8436-9f6361> (Accessed: 1 June 2022).
- UNESCO (2020) *Global education monitoring report, 2020: Inclusion and education: all means all*. UNESCO Digital Library. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000373718> (Accessed: 21 June 2022).
- United Nations Framework Convention on Climate Change (UNFCCC) (1992). Treaty Doc No. 102–38, 1771 U.N.T.S. 107. <https://unfccc.int/resource/docs/convkp/conveng.pdf> (Accessed: 5 July 2022)
- UNFCCC (1997). Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 2303 U.N.T.S. 162 <https://unfccc.int/resource/docs/convkp/kpeng.pdf> (Accessed: 5 July 2022)
- UNFCCC. (2006). *Africa is particularly vulnerable to the expected impacts of global warming*. https://unfccc.int/files/press/backgrounders/application/pdf/factsheet_africa.pdf (Accessed: 5 July 2022)
- United Nations (2014). Conference of the Parties. The Lima Ministerial Declaration on Education and Awareness-raising. <https://unfccc.int/resource/docs/2014/cop20/eng/l01.pdf> (Accessed: 5 July 2022)
- United Nations (2021) Nationally determined contributions under the Paris Agreement. Synthesis report by the secretariat. <https://unfccc.int/documents/632334> (Accessed: 5 July 2022)
- Vorisek, D. L., & Yu, S. (2020). *Understanding the cost of achieving the Sustainable Development Goals*. World Bank Policy Research Working Paper, (9164).
- Waldron, F., Ruane, B., Oberman, R., Morris, S. (2019). Geographical process or global injustice? Contrasting educational perspectives on climate change. *Environmental Education Research*, 25:6, pp. 895–911.
- Walker, W.E. and van Daalen, C.E. (2013). 'System Models for Policy Analysis', in Thissen, W.A.H. and Walker, W.E. (eds) *Public Policy Analysis: New Developments*. Boston, MA: Springer US (International Series in Operations Research & Management Science), pp. 157–184.
- Weart, S.R. (2008). 'Speaking Science to Power', in *The Discovery of Global Warming*. Harvard University Press (Revised and Expanded Edition), pp. 155–176
- Wesseling, A. and Gouldson, A. (2014). Pathways to impact in local government: the mini-Stern review as evidence in policy making in the Leeds City Region. *Policy Sciences*, 47(4), pp. 403–424.





Climate-U

Transforming Universities
for a Changing Climate

About Transforming Universities for a Changing Climate

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

Our Partners

