Transformative Learning for Global Change? Reflections on the WASCAL Master Programme in Climate Change and Education in the Gambia

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Abstract

African universities could be appropriate settings to start a process of creative re-thinking about alternative economic and climate-friendly development pathways that lead to socially inclusive growth and the alleviation of poverty. Education, capacity building, and a transformative learning agenda have come into academic and political focus. This chapter begins with a brief conceptual overview of the current research and work streams on climate change communication and education, followed by an introduction to climate change activities in The Gambia that sets the stage for an empirical examination of a master programme training West African students in 'Climate Change and Education' at the University of The Gambia. The findings illustrate practical challenges, students' backgrounds and motivations, contestations over the curriculum, as well as the university's restricted bargaining power due to its dependency on a single foreign donor. While embracing inter- and transdisciplinarity, the transformative learning agenda called for by European scholars has not yet been taken up.

1   Introduction

Universities will play an essential role in influencing African economies and societies in the coming decades. During their training, students work on their skills, study up-to-date material, and conduct research. They are, however, also influenced by their zeitgeist, the dominant political paradigms and challenges of their time, as well as by contemporary approaches to facing these challenges. Graduates then carry their knowledge and ideas into their work environments and start translating them into policy and practice. In this way, universities may serve as catalysts for social and economic transformation processes in their countries, many of which face the combined challenge of attaining poverty-alleviating growth that is simultaneously both economically sustainable and socially inclusive.

Climate change certainly belongs to the dominant political paradigms of the 21st century. Today, humankind lives in a world that faces a number of historically unprecedented, self-manufactured risks, such as nuclear power hazards, the highest global population in our history, rapidly spreading global pandemics, and data abuse via the internet.[1] Anthropogenic climate change, a process that started around the 1790s with the beginning of European industrialisation, belongs to this list of anthropogenic effects that have changed the earth so irrecoverably that sociologist Anthony Giddens, in his lecture on "The Politics of Climate Change" at Durham University in 2012, argued that we now live in "a world that has fallen out of history".[2] Therefore, on the one hand, one may think that human experience is of little help in guiding our future actions and, as climate change is a historically young process, a look at the past may not be very useful; on the other hand, however, there is rich academic research and documentation of environmental change and human responses thereto that may guide our present educational efforts in this regard.

Another way to describe our times—the Anthropocene—in relation to climate change is from the theoretical standpoint of post-normality, which describes a state that is characterised by much uncertainty, high political stakes, values, and vehement demands for urgent decisions.[3] This view may lead to a shift in perspective away from responding to climate change with rational, technical, and economic approaches towards an acknowledgement of the historical contingency of consumers' demands, lifestyles, and practices in industrial societies, which form "the primary problem underpinning climate change [namely] the continuing energy and material intense character of contemporary industrial society".[4] If conditions and habits are historically constituted and not naturally prescribed, they may change again, and science and policy may determine, to some extent, the direction in which changes lead and which pathways are socially suitable. One of the challenges of our time, therefore, consists in undertaking a "fundamental re-thinking of the kind of societies we aspire to and then abstracting from this which technology, which

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1   Giddens, Anthony, *The Politics of Climate Change* (Cambridge: Polity, 2009).

2   Durham University, "The Politics of Climate Change" (talk by Anthony Giddens, October 31, 2012), last modified November 7, 2012, accessed August 9, 2015. http://www.youtube.com/watch?v=yCgzxnRKhcU&list=PL1zMD_kTXdjzTG8CnFyh1abezH-FmkP8V.

3   For a critical review of the concept, see Turnpenny, John, Marvis Jones, and Irene Lorenzoni, "Where Now for Post-Normal Science? A Critical Review of its Development, Definitions, and Uses," *Science, Technology, & Human Values* 36.3 (2011): 287–330, accessed June 8, 2015. doi:10.1177/0162243910385789.

4   Healy, Stephen, "Post-Normal Science in Postnormal Times," *Futures* 43.2 (2011): 204, accessed June 8, 2015. doi:10.1016/j.futures.2010.10.009.

science, which economics might best serve this purpose, rather than the other way around".[5]

As universities are places of knowledge production and circulation, they may be relevant actors in social education on climate change in West Africa. First, universities could be appropriate settings to start such a process of creative rethinking in combination with research on the social and technical feasibility of alternative economic and development pathways. This rethinking project is inherently political in character. Second, universities can be places where political visions are initiated and from where the discourse can then be carried into wider society. O'Brien et al. point out that rethinking education and capacity building as a response to climate change, in particular, resembles calling for "nothing less than a revolution" in education, especially by building on interdisciplinary and transdisciplinary approaches as well as through transformative learning.[6] Transformative learning in this context means "synthesiz[ing] and apply[ing] the latest findings from a range of fields, including cognitive science, teaching methods, creativity and collaborative knowledge creation to transform education".[7] The authors are quite optimistic that developing countries are more open-minded towards transdisciplinary approaches than Western universities; however, they acknowledge the "tendency to mimic northern agendas [...] rather than to develop an endogenous narrative and agenda on what is needed in capacity building"[8] because of the unequal distribution of resources and voices in the academic world.

One other keyword in this context is 'leapfrogging'. The statistics on populations and economies in sub-Saharan Africa clearly tell us that the countries of the continent tend to follow economic pathways and dynamics that differ from those taken by the industrialised European countries and the fast-growing Asian economies (see the chapter by Dietz in this volume). This is partly due to their specific colonial and national histories as well as their environmental conditions. However, technological leapfrogging is another variable. Examples thereof include mobile phone technology, which leapfrogged the extension of telephone wires, as well as off-grid wind and solar energy provision. Renewable energy generation in African countries may serve climate change mitigation, on the one hand, and the extension of basic energy services on the other. Low

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5   Healy, "Post- Normal Science in Postnormal Times," 204.
6   O'Brien, Karen et al., "You Say You Want a Revolution? Transforming Education and Capacity Building in Response to Global Change," *Environmental Science & Policy* 28 (2013): 49, accessed June 8, 2015. doi:10.1016/j.envsci.2012.11.011.
7   Ibid., 50.
8   O'Brien et al., "You Say You Want a Revolution?" 55.

carbon energy generation, efficient transport systems, and low-energy architecture in urban centres, for example, are options that require more political lobbyism and expertise in Africa. As such, knowledge production and circulation are not the only matters of concern here. University education may also deliver visions for transformation and point to values to guide individual behaviour, economic investment, and legal reforms.

The limited number of university programmes on climate change in West Africa do not seem to go very far. Political perspectives are not given high priority in the current curricula; instead, these programmes are dominated by a scientific approach that is geared towards understanding physical climate change and, foremost technical adaptation. Education, however, is perceived by the United Nations Framework Convention on Climate Change (UNFCCC) as one crucial ingredient of adaptation.[9] Padgham et al., for instance, state that investments in "education and training, curricula development, research, and effective practices for communication of research findings [...] are in essence an adaptation response"[10] that needs to be pursued in sub-Saharan countries. They also state that "the potential of African Universities [...] to be active participants and agents for transformative change is not being fully realized".[11] This is an issue of investment into curricula and teaching methods, into research and science communication, as well as a matter of political participation. It is important for the new generation of students to gain more scientific knowledge on climate change as well as knowledge of its ecological, economic, social, and political impact and possible responses thereto. It is also important for future engineers, architects, economists, and other experts to gain an awareness of how their work contributes to environmental degradation and global warming,[12] as well as to develop ideas about alternative work and life models.

Some of the existing post-growth debates popular among actors from industrial societies as well as suggestions for simple and sufficient ways of living in

9   Climate Change Secretariat: UNFCCC, ed., *The Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change: Action on the Ground. A Synthesis of Activities in the Areas of Education, Training and Awareness-Raising for Adaptation* (Bonn: UNFCCC, 2010).

10   Padgham, Jon, Hassan Virji, and Clark Seipt, "Promoting Climate Change Curricula Development at African Universities," *Environmental Development* 5 (2013): 169, accessed June 8, 2015. doi:10.1016/j.envdev.2012.08.001.

11   Ibid., 169.

12   Leal Filho, Walter, "Climate Change at Universities: Results of a World Survey," in *Universities and Climate Change: Introducing Climate Change to University Programmes*, ed. Walter Leal Filho (Berlin, Heidelberg: Springer, 2010), 2.

order to attain sustainability[13] will probably be contested and resisted by sections of the urban African middle classes, who have successfully left poverty and the subsistence economy behind and have oriented themselves towards the social and economic achievements of the industrialised countries (such as global market integration, consumerism, high mobility, and high energy demand). These classes, however, do also tend to show an increased awareness of environmental issues (including clean environments, healthy food, and sustainability). Meanwhile, for many Africans living in rural areas, the global transition town model[14] is also unlikely to prove compelling, because subsistence lifestyles and low-energy consumption are the norm there anyway and are rather perceived as a development drawback that needs to be overcome. This underlines the important role of African universities as institutions that initiate processes of transformative learning and where locally embedded visions and alternative models of low-carbon yet efficient economies will be envisaged and tested.

Scientific knowledge on climate change will not meet any significant resistance in contemporary academic and political circles. The very high political priority given to climate change by the international community—the urgency paradigm—is, however, contested by several African countries[15] that clearly prioritise other contemporary challenges, such as HIV/AIDS, Ebola outbreaks, national security, or high rates of unemployment and poverty, over adaptation and CO_2 mitigation.

Another challenge for climate change education should not be ignored: uncertainty in climate model projections is an epistemological condition of climatology. The findings that derive from climate projections create visions of the environmental and social realities of the coming decades. Models, however, produce very abstract forms of knowledge that extend beyond the grasp of most people.[16] The science of climate change, therefore, needs to be translated to become meaningful and conceivable for the public. Moreover, since research and polity cannot also but rely on a mutual understanding of numerous

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13 For the debate in Germany, cf. for example: Schneidewind, Uwe, and Angelika Zahrnt, *The Politics of Sufficiency: Making It Easier to Live the Good Life* (Munich: Oekom, 2014).

14 Transition Netzwerk e.V., "Was ist eine Transition Town Initiative?" accessed October 10, 2018. https://www.transition-initiativen.de/was-ist-eine-transition-town-initiative.

15 Lockwood, Matthew, "What Can Climate-Adaptation Policy in Sub-Saharan Africa Learn from Research on Governance and Politics?" *Development Policy Review* 31.6 (2013): 647–676, accessed June 8, 2015. doi: 10.1111/dpr.12029

16 Climate models and their inherent uncertainties are difficult to understand for non-modelers, since they are technically complex and require expert knowledge to understand the methodologies employed in the process.

diversely interpreted frameworks of climate change, there is even more need for translation work to be done between these different systems of knowledge as well as between different interest groups and across various sectors and scales.

The chapter begins with a brief conceptual overview of the current research and work streams on climate change communication and education, followed by an introduction to climate change activities in The Gambia to set the stage for an examination of a master programme at the University of The Gambia (UTG) that trains students in 'Climate Change and Education'. This programme forms part of the WASCAL Graduate School Programme, which will be described before discussing the Gambian experience in detail.

2   Current Research and Work Streams

2.1   *Science Communication and Public Education*

As in any form of journalism or education, "communication about climate change needs to be informed by the latest research evidence based upon a very clear understanding of the demographics of the target audience, their media preferences and opinion leaders, their political ideologies and cultural worldviews".[17] The skills required to do this kind of translation work are usually taught at the university level in communication science and public health programmes.

Apart from scientific studies on climate change, the international market offers an increasing number of popular science books on the topic as well as books aimed at particular audiences (such as children or youth).[18] The availability of these books in West Africa, however, is still very limited and is therefore not discussed here. Another fruitful area of study is curricula development, but the analysis of farmers' uptake of climate forecasts and media discourse on climate change is probably the most researched area of climate science translation.[19] The number of anthropological studies on

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17   Anderson, Alison, "Rethinking Climate Change Communication," in *Culture, Politics and Climate Change: How Information Shapes Our Common Future*, ed. Deserai A. Crow, and Maxwell T. Boykoff (Abingdon, New York: Earthscan from Routledge, 2014), 222.

18   See, for example, the children's book about the importance and restoration of mangrove forests in Eritrea by: Roth, Susan, and Cindy Trumbore, *The Mangrove Tree: Planting Trees to Feed Families* (New York: Lee and Low Books, 2011).

19   E.g. Lewis, Justin, and Tammy Boyce, ed., *Climate Change and the Media* (New York, Bern, Berlin, Brussels, Frankfurt, Oxford, Vienna: Peter Lang, 2009).

climate change communication and its interplay with local cultural models and knowledge systems is also increasing.[20]

2.2   *Cultural Representations and Image Politics*

Only recently have the image politics of climate change—the delivery of politically relevant meaning through visual media—entered the scholarly debate. Schneider and Nocke have shown how the translation of climate science happens and why translation faces the challenge of "visualizing the unimaginable".[21] Translations of climate science have moved beyond the academic sphere and into the global political arena of the UNFCCC (with the IPCC assessment reports representing the most powerful translation exercise in this domain) and, from there, into diverse sectors. The initial engine for this translation and knowledge distribution exercise was Article 6 of the UNFCCC and the resultant Nairobi Work Programme, which was introduced at the Conference of Parties (COP) in Montreal in 2005:

> Under Article 6, Parties are to promote and facilitate at the national and, as appropriate, subregional and regional levels: (a) the development and implementation of educational and public-awareness programmes on climate change and its effects; and (b) the training of scientific, technical and managerial personnel.[22]

These educational sectors included development cooperation, whereby climate change is translated into outreach material, manuals, and toolboxes. The production of this sort of informational material has accelerated over the past five years[23] in West Africa, especially in The Gambia.[24]

Climate change is also appropriated by actors who contribute to other cultural domains, such as arts and popular culture. Illustrations, cartoons, and

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20   E.g. Rudiak-Gould, Peter, "Promiscuous Corroboration and Climate Change Translation: A Case Study from the Marshall Islands," *Global Environmental Change* 22 (2012): 46–54.

21   Schneider, Birgit, and Thomas Nocke, "Image Politics of Climate Change: Introduction," in *Image Politics of Climate Change: Visualizations, Imaginations, Documentations*, ed. Birgit Schneider, and Thomas Nocke (Bielefeld: transcript, 2014), 10.

22   Climate Change Secretariat: UNFCCC, *The Nairobi Work Programme*.

23   Lockwood, Matthew, "What Can Climate-Adaptation Policy in Sub-Saharan Africa Learn," 647–676.

24   E.g. Shanahan, Mike et al., *Climate Change in Africa: A Guidebook for Journalists* (Paris: UNESCO, 2013); Ampomah, Gifty, and Tahia Devisscher, *Adaptation Toolkit: Guidebook for Researchers and Adaptation Practitioners Working with Local Communities* (Dakar: ENDA, 2013).

photographs visualising the impact of climate change on the lives of humans and other species serve as images that "have started to shape the [Western] imagination of a world under the conditions of climate change".[25] Some of these images have travelled globally[26] and have even developed into iconic representations of climate change (such as the polar bear on its melting ice floe), which in turn tend to create their own realities.[27]

The imagery of climate change in Africa mainly depicts familiar representations of the cultural desertification discourse of deadly dryness, which is iconised in images of cracked soils, starving people, and animal carcasses. As such, there seems to be little visual distinction between drought and climate change. The increase in floods has not yet become part of global public consciousness, nor have coastal erosion, loss of biodiversity, or other physical manifestations of the effects of climate change.[28] Climate change appears to affect mainly poor rural farmers and herders, as well as the poor inhabitants of coastal towns. In contrast, the urban metropolis and the 'modern Western lifestyles' of the African urban middle classes seem to be completely omitted from the current global iconography of climate change in Africa.[29]

On the one hand, communication practitioners require skills and knowledge to perform translation work, including writing ability, technical skills to draw infographics and edit outreach materials, and knowledge of public relations. The curation of exhibitions, photography, and film-making are additional options for raising awareness. All such skills can be taught through training and practical exercises. On the other hand, there is also a demand for scholars to be able to conduct research on existing communication channels, images, and narratives. This means that graduates could also be trained to become experts in the media and communication sciences by undertaking a more academic-focused programme that is sensitive to the power of images for the delivery of political messages when analysing and reflecting on visual discourses.

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25   Schneider, and Nocke, "Image Politics of Climate Change," 10.
26   Ibid., 17.
27   Von Storch, Hans, and Werner Krauß, *Die Klimafalle: Die gefährliche Nähe von Politik und Klimaforschung* (Munich: Hanser, 2013), 75.
28   Climate change is of course only one variable contributing to these phenomena.
29   A general indication thereof can be attained from a search for images on Google or other search engines using the keywords "Climate Change Africa", as well as from images on the covers of books and reports about climate change in Africa.

2.3   *Translation and Knowledge Brokerage*

Krauss and von Storch argue that public education on climate science is no longer the issue of the day and that, instead, the main challenge is "to connect scientific climate knowledge to the everyday reality and perceptions of climate and weather of people living in vulnerable areas".[30] According to them, the dialogue between climate science and "cultural climatology approaches"[31] relies on knowledge brokers who mediate between the science and the stakeholders. Furthermore, these knowledge brokers have to translate and connect scientific and local knowledge; as such, they must be conversant with and fluent in both knowledge systems.[32] Were this understanding of translation work to guide curricular development, a different set of knowledge and skills would become a part of it, including courses in social and cultural anthropology/regional cultural studies and science communication.

2.4   *Educational Technologies*

Modern technologies provide new possibilities for supporting public education with regard to climate change in Africa. Educational technology, also termed 'information and communication technology' (ICT) in education or 'e-learning technology', is "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources".[33] It encompasses hardware, software, and educational theories geared towards enhancing learning. Although the term 'educational technologies' may refer to all kinds of analogue technologies, such as photographs, film, and video, it is usually used specifically to discuss digital computer technology. Depending on the objectives of educational activities and their target groups, numerous methods and tools could be used to strengthen the competencies and capacities of stakeholders who are facing climate change-related challenges in Africa.

Telecommunication-based information systems, audio, and video are mostly used in a non-formalised learning context for public education and to raise public awareness. Interactive voice response systems, as a specific solution offered by telecommunication-based information systems, allow users to call in, select, and receive preconfigured information about different topics.

30   Von Storch, and Krauß, *Die Klimafalle,* 216.

31   A term taken from Endfield, Georgina, "Reculturing and Particularizing Climate Discourses: Weather, Identity, and the Work of George Manley," *Osiris* 26.1 (2011): 145.

32   Von Storch, and Krauß, *Die Klimafalle,* 222.

33   Richey, Rita C., "Reflections on the 2008 AECT Definitions of the Field," *TechTrends* 52.1 (2008): 24–25, accessed June 8, 2015. doi:10.1007/s11528-008-0108-2.

Platforms such as Frontline SMS,[34] which operates as an open-source solution for distributing and collecting information via text messages, are already used in several African countries in the context of disaster response and recovery, climate change mitigation, and food security. Community radio stations and participatory videos are also effective tools to reach and empower communities and to raise awareness. The UNESCO project "Empowering Local Radio with ICTs" built up the staff capacity of 32 local radio stations in seven African countries from 2012 until the end of 2014. The Red Cross/Red Crescent Climate Centre utilises videos developed by farmers and local communities for public education.

The evolution of the internet from a static information broadcasting medium to an interactive environment (the so-called Web 2.0) makes it very easy and inexpensive for people to communicate, network, create, share, or exchange information and ideas. Social media improves individual and group communication, synchronous broadcasting, collective authoring, and dissemination of opinions, and documents, and it allows for questions to be raised and discussions to be opened. Social media, which is mainly used by urban youth, is also becoming increasingly important for the delivery of public education. Online communities of practice, such as MyCoop,[35] have emerged in Africa to support online learning. Classical media channels such as community radio, television, CDs, and DVDs are still in predominant use in remote areas for people with low levels of literacy and limited access to internet. However, mobile phones, combined with content in local languages, are increasingly being used to make the transition between these classical channels and the new forms of media.

Self-paced content and learning activities delivered through CD/DVD or online via a digital learning environment are other approaches being used in formal learning contexts (schools and universities) as well as for advanced training (of stakeholders and decision makers). Open educational resources, webinars, and Massive Open Online Courses (MOOCs) are complementary solutions used by African students to improve their knowledge and to complete modules of their curriculum.[36] Many universities exploit the advantages of e-learning or distance learning using modern ICT to improve the quality

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34   Frontline, "Frontline SMS Africa," accessed August 9, 2015. http://www.frontlinesms
      .com/tag/africa/.
35   MyCoop, "Managing Your Agricultural Cooperative," accessed August 9, 2015. http://
      moodle.itcilo.org/mycoop/.
36   For example, the online course offered by the UNFCCC in partnership with the University
      of Reading entitled "Climate Change: Impact and Responses", developed in cooperation
      with seven East African universities and launched in 2015, accessed August 28, 2015.
      http://www.reading.ac.uk/ssc/resource-packs/ccir/.

of their educational programmes. Although technical tasks can be outsourced to technicians, educational technologies do require climate change translators and educators to adhere to suitable formats and content. While each educational technology may be suitable for the teaching of specific content, it may be less suited to other material.

3   Climate Change Adaptation and Mitigation Activities in the Gambia

Despite being a very small African state with only about two million inhabitants, The Gambia has adopted a proactive role and is visible in the international political climate change arena. It has been actively following the UNFCCC road map by preparing and promptly submitting two national communications, a 'National Adaptation Program of Action' and a 'Nationally Appropriate Mitigation Action', to the UNFCCC Secretariat. The national delegation also played an active role in the COP negotiations, especially when the UNFCCC focal point for The Gambia and head of the Gambian COP delegation, Pa Ousman Jarju, was also chair of the Least Developed Country group from 2011 to 2012.

The government has revised its legal framework and established new laws, including the National Disaster Management Act of 2008 and the Renewable Energy Act of 2013 (see Figure 8.1). The most important national policies have also undergone a process of climate mainstreaming.[37] By 2014, the National Climate Change Policy was a work in progress, the realisation of which was being actively pursued. The Gambia has been a member of the West African Science Service Centre for Climate Change and Adapted Land Use (WASCAL) since 2010 (see below). In 2013, the Gambian parliament ratified the WASCAL agreement and constitution, which entails financial responsibilities towards this regional initiative. The government under former president Yahya Jammeh, which was in power until 2017, clearly intends to make use of the funding opportunities offered by the UNFCCC mitigation framework to increase the national power supply and to implement the envisaged Low-Emission Climate-Resilient Development Strategy of 2014.[38] There are indications that

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37   Lauer, Hannes, and Irit Eguavoen "Mainstreaming Climate Change Adaptation into Development in the Gambia: A Window of Opportunity for Transformative Processes?" in *Innovation in Climate Change Adaptation,* ed. Walther Leal Filho (Berlin: Springer, 2016), 87–98.

38   Ripplinger, Pascal, "Renewable Energies in Sub-Saharan Africa: A Case Study of the Gambia" (MSc thesis, University of Bonn, 2014).
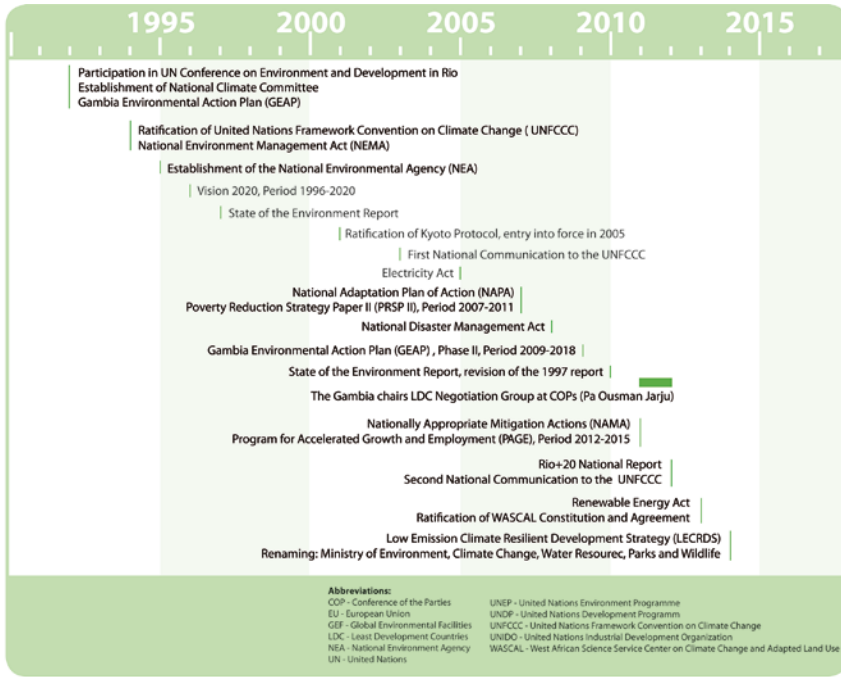
FIGURE 8.1   Historical outline of the climate change adaptation policy process in the Gambia

the democratically elected government under President Adama Barrow continues this policy since 2017.[39]

The Gambia is also one of the first countries to have integrated the term 'climate change' into the name of its national environment ministry. In September 2015, The Gambia submitted the Intended Nationally Determined Contributions (INDC) to the UNFCCC, being among the first countries to have done so.[40]

The country also acts as a front runner in the area of climate change education by hosting the first international university programme of its kind in West Africa. The programme was launched in 2013. In early 2014, the Gambian

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39   This chapter, however, describes the Gambian policy environment under the Jammeh government.

40   UN Framework Convention on Climate Change (UNFCCC), "The Gambia Submits its Climate Action Plan Ahead of 2015 Paris Agreement", last modified September 28, 2015, accessed February 05, 2019. https://unfccc.int/news/the-gambia-submits-its-climate-action-plan-ahead-of-2015-paris-agreement.

Ministry of Basic and Secondary Education announced the extension and radical reform of the country's school curricula to respond to climate change and related environmental hazards. The ministry also initiated a cooperation and memorandum of understanding with the NGO Biodiversity Action Journalists Gambia in a bid to become involved in public education campaigns for different audiences, especially media representatives.

4   The West African Science Service Centre for Climate Change and Adapted Land Use (WASCAL)

Climate services can be briefly described as customised information products that are delivered to the public by specialist organisations.[41] Taking the Climate Service Center (CSC) in Hamburg as a role model,[42] the German Federal Ministry of Education and Research (BMBF), which is the main funder of the CSC in Germany, started an initiative to establish similar institutes in the West and Southern African regions.

Reducing knowledge uncertainties about future climate and providing useful recommendations for climate change mitigation and adaptation as well as other climate services in the West African region are central to WASCAL's mandate. By 2018 it had been ratified by eleven West African countries, having received the legal status of an international research institute from the Economic Community of West African States (ECOWAS) in 2013. The aim of the Climate Service Centre is ambitious, as it envisions hosting expert staff and networks as well as a central data management system to serve the region. It aims to facilitate the pooling of climate knowledge in West Africa and strengthen the position of the eleven West African member countries[43] in international climate change negotiations. The organisation also supports politicians and other

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41   For a definition as well as a discussion of challenges, see Bowyer, Paul, Guy P. Brasseur, and Daniela Jacob, "The Role of Climate Services in Adapting to Climate Variability and Change," in *Handbook of Climate Change Adaptation*, ed. Walter Leal Filho (Berlin: Springer, 2015), 533–550.

42   The German CSC in Hamburg, also known as the German Climate Agency, was founded in 2009 and works in response to requests by private individuals, organisations, businesses, and political decision makers. It offers news scans as well as many other products and services to facilitate science communication and knowledge transfer. All services are provided by a team of 35 to 40 scientists. One of the four departments within the non-profit organisation is a communication department.

43   The eleven countries are Senegal, Gambia, Mali, Burkina Faso, Niger, Côte d'Ivoire, Ghana, Togo, Benin and Nigeria. By 2015, negotiations over membership were ongoing with four of the remaining five ECOWAS countries (Cape Verde, Liberia, Sierra Leone, and Guinea),

stakeholders in deciding on regional adaptation and mitigation options. The work of WASCAL, which is primarily concerned with producing and delivering climate services, has been accompanied by the WASCAL Governing Board as well as an international Scientific Advisory Committee.

Administration and coordination of WASCAL are located in Ouagadougou and Accra. The organisation's headquarters in Accra hosts a Capacity Building Department, which includes a division of the Graduate Study Programme (see below) and a division of the In-Service (Professional) Training Programme in charge of online learning, short-term training, and other capacity building programmes.[44] In August 2015, the Competence Centre in Ouagadougou had a staff complement of ten researchers as well as eight administrative and technical support members in addition to an executive director. About four years after the establishment of the centre, however, the educational interface was not yet operational. Instead, the dominant idea was to generate research results that would then be translated for and communicated to public audiences. The idea of offering demand-driven climate services, inter alia the provision of customised information products upon request, was not yet prominent.

5   University Education under WASCAL

There are a number of different networks across the countries that form part of the organisation. The WASCAL Graduate Study Programme is run at ten West African universities in nine countries and has a financial volume of €10.2 million (2010–2016).[45] About 160 students from the West African region are enrolled in one of the ten doctoral and master programmes (Figure 8.2), from which the first students graduated in 2014. WASCAL grants all students a monthly stipend as well as research funds during their enrolment period. Doctoral students write up their dissertations in their home countries and also have the opportunity to spend some months at a European university.

The participating universities admit citizens of member countries to the programme according to a quota system (one student per country per academic year). This means that applicants from countries with a lower number

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while the other ECOWAS member state, Guinea-Bissau, had already signed the WASCAL constitution. These negotiations also concerned themselves with the question of how to integrate WASCAL into ECOWAS structures.

44   WASCAL, Memorandum CBP/001/2015, Accra.

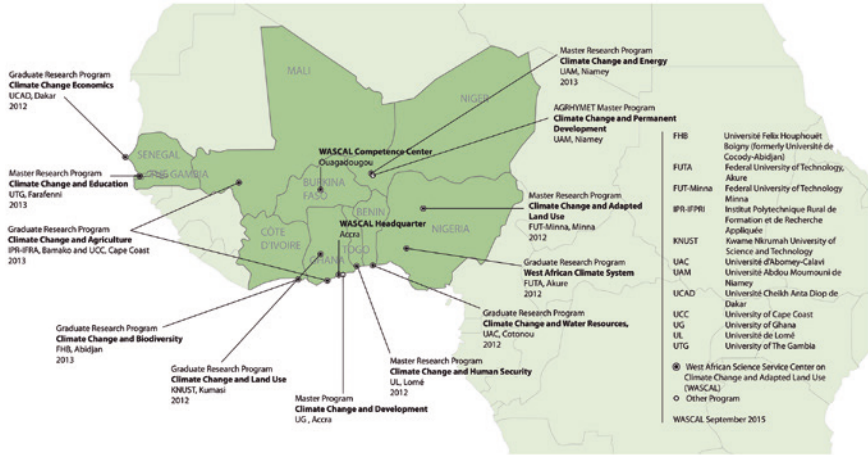45   WASCAL, *Report 2010–2014* (Bonn, 2015).

FIGURE 8.2   Capacity building on climate change at West African universities
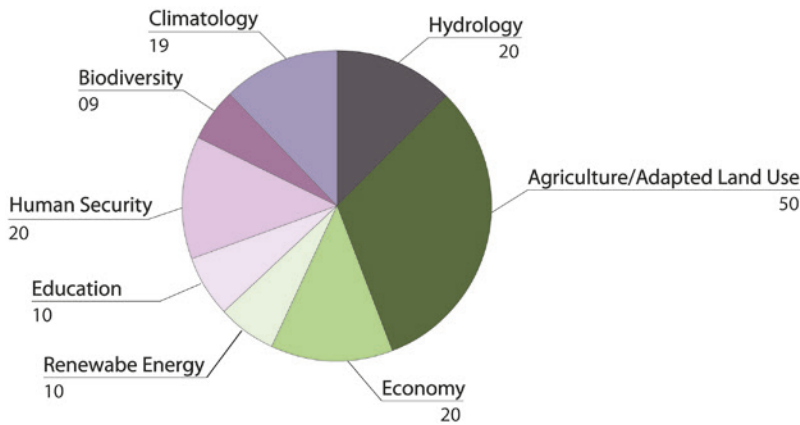

FIGURE 8.3   Areas of capacity building in the WASCAL Graduate Study Programme

of potential candidates (due to smaller national populations and fewer universities), such as The Gambia or Togo, enjoy a comparative advantage over applicants from countries with strong academic landscapes, such as Ghana and Nigeria, where universities are able to develop additional programmes (such as the Climate Change and Sustainable Development master programme at the University of Ghana, which is not part of WASCAL) more easily.

There is a strong natural science bias in the Graduate Study Programme (108 out of a total of 158 students). Three programmes (see Figure 8.3) share a focus on agriculture and adapted land use (together enrolling fifty students), while the economic as well as the human security programmes enrolled a combined

total of forty students. The three-year doctoral programme offers students the opportunity to pursue studies in the natural sciences and economics only.

The MSc programme in Climate Change and Education was not included in the initial WASCAL proposal but was later added to the institutional portfolio after the Gambian member of the WASCAL Advisory Board suggested this idea, which received immediate support from the other board members. In a two-year programme, students are expected to become experts who are competent and creative in the translation of climate projections, technological approaches, risk uncertainties, and potential adaptation and mitigation options. However, the programme's purpose and curriculum are not uncontested. Curriculum development and implementation face several challenges, some of which have to do with the programme's current dependency on aid as well as the fact that it is a new course with no existing model to emulate.

6   Climate Change and Education MSc. Programme

6.1   *Observations on Campus[46]*

The MSc in Climate Change and Education is hosted at the University of The Gambia's North Bank Campus in Farafenni, a market town on the border with Senegal. The campus is located in three dozen previously abandoned office buildings, laboratories, and houses; dusty signs indicated their former purpose—that of housing a donor-funded medical research institute that relocated to a more central location some years earlier. The programme director and students from ten West African countries lived on this sleepy campus in very comfortable accommodation.

By the end of the third semester, students still had no access to television, while radios and newspapers had to be sourced individually. The library contained about eighty new and relevant books. The electricity supply was reliable but was limited to a few hours per day and was supported by a diesel generator. Internet access was provided via personal mobile phones and later via wireless LAN. The lack of access to media in everyday life was not optimal, especially for students training in the field of education and communication. Communication was generally a challenge, as international students did not speak the local languages. Although the students tried to interact with the local population

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46   These observations were made by the authors during a series of short-term visits to Farafenni in 2014 and 2015, where they were invited to teach. Their observations were complemented by discussions with students and staff, e-mail correspondence, and their own photographs.

through regular visits to the market and by attending Sunday mass, the international programme remained largely invisible to locals.

According to the orientation of the graduate programme, at least 25 per cent of the course content should deal with educational topics. However, most of the master's students' thesis proposals focused on the natural sciences and economics, although the proposals did contain an educational component (namely, the dissemination of research findings among relevant stakeholders using educational models and approaches). Fewer than thirty per cent of students were working on an empirical topic that focused primarily on climate change and education.

6.2   *Divergent Ambitions and a Contested Curriculum*

The MSc in Climate Change and Education commenced in The Gambia in November 2013 with a preliminary first-semester curriculum that included mathematics and statistics modules as well as a module on the 'Challenges of Climate Change Education'. The language of instruction is English. Students joined an intensive three-month English proficiency course in Ghana before moving on to The Gambia. As of March 2014, there was only a vague idea of which modules should be included in the revised curriculum. This was being developed in an ad hoc manner, with much depending on the availability of lecturers. Each module is supposed to offer 39 hours of teaching, in keeping with university regulations.

UTG is a young university with about four thousand students. It was founded in 1998 and operates on several campuses across the country. The Faculty of Education in Brikama is the largest, with eight teaching staff and about four hundred students. UTG mainly offers bachelor's degrees but also runs master's programmes; the WASCAL programme is currently the only international degree on offer. WASCAL supports UTG by funding the programme staff, guest lecturers, and scholarships for international students, as well as the renovation of infrastructure. UTG provides facilities on campus and pays for electricity and maintenance. Currently, however, there is "very limited investment in research and development in The Gambia [...] Research policy development, research investment and funding [...] research collaboration, and partnerships [...] are determined and treated as administrative matters without significant input from scientists."[47]

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47   Ozor, Frederick U., "Research Governance and Scientific Knowledge Production in The Gambia," *South African Journal of Science* 110.9/10 (2014): 6, accessed June 8, 2015. doi:10.1590/sajs.2014/20130185.

The small number of UTG teaching staff poses a challenge for the curriculum. Little academic expertise on climate change is yet available in The Gambia, while UTG lecturers are generally occupied with other programmes. As a result, some lecturers teaching in the WASCAL programme are based in other West African countries or in Europe. The director of the master's programme (who holds degrees in chemistry and education) also serves as dean of the Faculty of Education, a job that brings with it numerous additional duties and frequent appointments on other campuses.

During a preparation meeting among lecturers in Germany, important questions arose: What kind of master's programme should be offered? What would the students need to know? These questions had been discussed by the advisory board of the master's programme in 2013, at a time when the board was composed exclusively of West African natural scientists who envisioned a science programme in climate change with an educational component. Moreover, as outlined in the introduction, practice-oriented modules in line with new trends in climate change education—such as action-based learning, problem-based learning, and living laboratories—were not sufficiently included in the curriculum. A module on transformative learning suggested by some of the international lecturers was also absent.

Some external lecturers, however, assumed that the programme would contribute primarily to the arts and humanities (despite being categorised as an MSc programme) by focusing on communication and public education skills that would enable graduates to translate climate science for non-scientific audiences in their future careers. As such, these lecturers envisioned an educational programme with an environmental specialisation.

These divergent visions eventually became apparent in the final curriculum (see Figure 8.4) and in the research proposals by master's students (most of whom proposed science projects with an educational outreach component). The confrontation with the final programme outcome led to disappointment on the part of some of the lecturers, especially among those who had sought to strengthen the role of the social sciences and humanities and had identified the need to develop capacities in public education and science communication within WASCAL. In addition, some students had enrolled in the programme out of a particular interest for public or environmental education, thinking that it was an education and communication programme. Some practical modules on education were integrated into the curriculum (Tables 8.1 and 8.2), but science modules were ultimately dominant. At the end of the teaching modules, neither modules on environmental nor climate change communication had been offered. Instead, the curriculum ended with a module on climate science.

Curriculum of first batch (Module = 39 h)

Climate Change (and Natural Science) Modules

1. Politics of climate change and adaptation
2. Population dynamics and climate change
3. International legal framework of climate change/traditional knowledge: pastoralism
4. Biology conservation
5. Biodiversity management in West Africa
6. Climate change and water resources
7. Ecosystem-based adaptation
8. Climate change and agriculture
9. Science of climate change

Education Modules

10. Educational challenges of climate change
11. Material development and teaching aids
12. Educational technlogies
13. Curriculum development
14. Climate change exhibition in Accra

Others

15. Statistics and pre-calculus
16. Biostatistics
17. African ecocriticism
18. Public Policy
19. Research methodology
20. SPSS
21. Geographic Information Systems
22. Presentation and writing skills

FIGURE 8.4   Curriculum of climate change and education, February 2015

TABLE 8.1   Transdisciplinary learning: Curation of an educational exhibition

The WASCAL students from the programme were invited by the Ghanaian Mmofra Foundation, which runs a community children's park in Accra, to help curate a climate education exhibition. The exhibition was built like a playground parkour for children aged eight to 15 years. The students conceptualised the exhibition, designed its elements and put them in place in Ghana. After opening, they offered guided tours along the parkour during which they explained in chronological order what climate was, as well as the causes and effects of climate change, before showing how people could adapt to climate change and help mitigate further CO_2 emissions. The project was supported by the German Embassy in Ghana and the British High Commission.

WASCAL programme students were invited by the Ghanaian Mmofra Foundation, which runs a children's community park in Accra, to assist in curating a climate education exhibition. The exhibition was built to resemble a playground parkour for children aged eight to 15 years. The students conceptualised the exhibition, designed its individual components, and set them up in

TABLE 8.2   Technology-enhanced learning in the context of climate change

While the first part of this module focused on learning theories and models, as well as the design of e-learning courses and their quality assessment, the second part was practically oriented. Open-content license models, open educational resource repositories and e-libraries were introduced. Students learned how to use the Learning Management System to administer and deliver e-courses. Afterwards, the students applied the content which had been developed during the first part to the Moodle Learning Management System, and they peer-assessed the learning modules of the other students. It was important in the African context to familiarise the students with open- content license models and open educational resource repositories.

Ghana. After the opening of the exhibition, they offered guided tours along the parkour, during which they explained in chronological order the definition of climate, the causes and effects of climate change, and how people can adapt to climate change and help to mitigate further CO_2 emissions. The project was supported by the German Embassy and the British High Commission in Ghana.

While the first part of this module focused on learning theories and models as well as the design and quality assessment of e-learning courses, the second part was practically oriented. Open-content license models, open educational resource repositories, and e-libraries were introduced. Students learned how to use the learning management system to administer and deliver e-courses. Thereafter, the students applied the content that had been developed during the first part of the course to the Moodle learning management system and peer-assessed the learning modules of the other students. It was especially important in the African context to familiarise the students with open-content license models and open educational resource repositories.

6.3   *Background and Aspirations of the Students*

In the WASCAL programme in The Gambia, the student gender ratio (six females to every four males) was more balanced than in other WASCAL graduate schools, where male students predominated. Six out of ten students had an educational background in either the natural sciences or economics, although there was a wider diversity in their first-degree disciplines (Figure 8.5).

None of the students had a disciplinary background in education. Only one student had a diploma and postgraduate degree in communication science as well as work experience in public education. Another student had
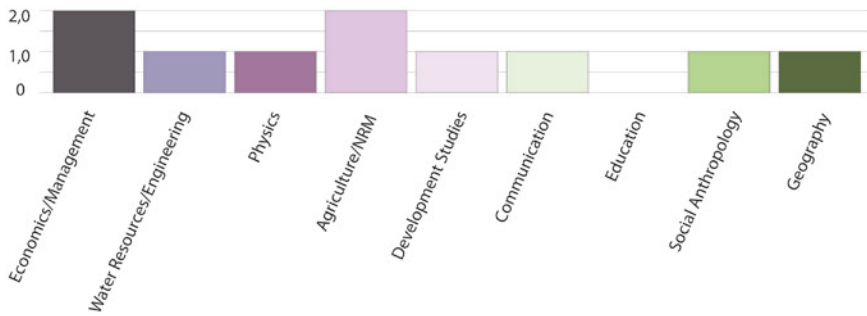
FIGURE 8.5   Educational background of students

NOTE: The selection process for prospective students is organised by
the individual WASCAL programmes. In the case of the MSc programme
in The Gambia, candidates were ranked by the director and the
Advisory Board.

worked for some years at a private company as a communications officer. Two
of the ten master's students already had a master's degree before entering the
programme.

Although some of the students had an interest in climate change or had
even undergone some training in this area, their knowledge at the beginning
of the course was quite limited. Nevertheless, all the students were highly mo-
tivated to learn about environmental issues and climate change. They were
communicative and readily involved themselves in role play, games, and other
creative activities. Conversations with the students were a means to investigate
their motivations for choosing the programme as well as their professional as-
pirations. Their comments illustrate that not all the students were eager to take
up a profession in the field of climate change communication and public ed-
ucation after graduation. Generally, the male students appeared to have been
more strategic in their reasons for selecting the programme. They identified
advantages over other master's programmes, such as the provision of scholar-
ships, international exposure and experience, the opportunity to build profes-
sional networks and learn English, and the greater chance of being admitted
into PhD programmes after graduation:

> I chose this programme first for the topics. The topic was about climate
> change, and I know climate change is a big deal. It is something very in-
> teresting, and I was thinking about doing an international master's after
> my undergraduate studies.
>
> The programme puts together students from ten countries. So it cre-
> ates a network among the students. If you finish this programme, you

already have a strong network. Some students you can collaborate and work with. I chose this programme because, first of all, I love to study the environment … something about environment … and, secondly, because there is a scholarship that can help me to study. […] I have a Master One degree [a BA degree]. After this programme, I am planning to look for an American scholarship for training—one year of training in the USA—because after this programme, I suppose I will have a good background in English. So, I can apply for this programme. And after this programme, I am planning to apply for a PhD from the WASCAL programme.[48]

The female students were more concerned with being able to teach and support people who are affected by climate change. Their potential future roles as climate change translators, however, were described only vaguely. Most students had no professional experience in science communication; hence, there was no obvious role model whom they could use for purposes of orientation:

I think that if people are more educated, they can face the challenges. So I think education is the basis of everything we can do about climate change.

How to educate people about climate change? The phenomenon … African countries are based on agriculture. They [farmers] don't know the term 'climate change.' But they know that the climate … the events … are changing. So, we have to educate them to adapt. Because the phenomenon … we cannot stop the phenomenon. But we can educate them to adapt to this phenomenon.

I wouldn't want to continue education in the climate change domain. So, I will be an expert in climate change, and maybe I can discuss climate change issues. And I will try […] to put [my BA degree in] natural resources [management] together to raise [foster] Africa's development. Because Africa's development, I think, is the most important. Because you cannot be learning, learning and, finally, we don't use it to develop … to do something good.

According to the IPCC […], my country […] is among those countries which are more affected by climate change. So, what I am looking for is to get the necessary background here and go and help my country easier there.

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48   All quotations are by students from the programme's first intake after they had been involved in the programme for a few months.

> When I go back to my country, I know that there are many problems
> due to climate change. Because there are floods. There is drought. So,
> how should we work with the environmental people? Look for some
> adaptation measures in order to help people ... those who are most
> affected.

6.4   *Financial Sustainability of the Programme*

The MSc in Climate Change and Education is highly dependent on German funding, which is also complemented by funding from UTG itself. Current accounting procedures to the BMBF involve four institutions in three countries (UTG, WASCAL headquarters in Ghana, the University of Bonn in Germany, and the so-called *Projektträger* (project-administrating organisation) also located in Bonn). This means that all receipts must be physically passed through all these institutions, a task that represents a logistical challenge given the size of the entire WASCAL organisation and its Graduate Study Programme across West Africa (which multiplies these efforts). These transnational money transfers and the accounting thereof are complex and demand a lot of manpower. Finally, an accountant had to be recruited particularly for this master programme.

In general, for its initial four years, WASCAL's basic dependency on donor funds has meant that the survival of the master's programmes has been completely dependent on decisions taken by the German Ministry. For example, the BMBF requested WASCAL to improve accounting and to reform the Graduate Study Programme, deciding to freeze a substantial amount of money that had already been assigned to the programme until these requests were met in a satisfactory manner. From the perspective of the funder, this is undoubtedly a legitimate request. In practice, however, the African partner universities could not recruit new students during the foreseen intake period or even for a year thereafter. In The Gambia, there was nothing UTG leadership could do to counteract the BMBF decision. The university had made five additional scholarships available for Gambian students in the second intake and had already selected new students for these and the WASCAL scholarships; however, it was now unable to recruit these candidates due to the frozen funding. This had a number of practical implications, thereby decreasing the overall efficiency and quality of the programme.

Extra funding from the German embassy in Ghana and the US Embassy's Science Fellows Program as well as the funders of the practical exercise in Accra supported the MSc in Climate Change and Education. In terms of economic efficiency, however, the programme was not yet efficient enough in its own right given the investment in funding and working hours required to produce

ten MSc graduates.[49],[50] The only way to balance cost and effect would be to rely on more enduring core funds, to decrease the number of international lecturers by relying more on local teaching staff, and to at least double the number of students per intake by accepting a higher number of Gambian and/ or self-financed students. Finally, enrolments should be undertaken every semester or year to reduce staff costs, facilitate exchange across intakes, and allow for more efficient use of the campus facilities.

7   Discussion

The WASCAL Graduate Study Programme attracts students because it offers them an opportunity for an international education as well as serving as a valuable source of income for two to three years. Although there is a need for experts in climate change education who could support the development of relevant communication science, public education, and climate services, not all graduates were interested in pursuing a career in this profession. A lack of role models and the unclear job descriptions in this field seem to be contributing to this reluctance. Climate change education requires a high number of skills, including educational, technical, and cultural skills, as well as a very good foundation in climate change knowledge itself. However, climate change education is a professional field rather than an academic discipline. As such, a definition of what constitutes climate change education still remains vague, especially because the production and delivery of climate services is also a comparatively young professional field.

In general, lectures on how to develop a better model in line with a transformational learning agenda were not part of the curriculum. Such modules could be proposed for the programme in future. It is unclear, however, who at UTG would have an interest in taking up this agenda. Though transformative learning was not emphasised, the programme was nevertheless interdisciplinary and transdisciplinary. For example, the curation of the exhibition in Accra was a very useful transdisciplinary element of the curriculum.

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49   From October 2013 to June 2015, the overall expenses for the programme's first intake of students amounted to €315,000 (ca. €35,000 per graduate). The first students graduated in November 2015. Future intakes will prove less costly, since they will benefit from prior infrastructural investment (such as in buildings, the library, and transport).

50   Ultimately, there were only nine graduates from the first intake because one student moved to Saudi Arabia to enrol in another master's programme that offered a more lucrative scholarship.

The transnational education model based on the 'flying faculty approach', which is followed by many excellent graduate programmes in Africa to invite lecturers and practitioners from abroad to teach short-term modules, represents an immense problem for students. The short period in which a module is taught places students under particular pressure. The content is very often condensed, intense, and difficult to digest within the short period of time during which the lecturer is still around to respond to questions. This approach also increases the overall cost of the programme as well as its carbon footprint.

Furthermore, most of the foreign lecturers were not able to meet staff from the respective UTG faculties during their short stays in The Gambia and were unable to learn about UTG's organisational and teaching structures, argue for the relevance of 'Climate Change and Education', or prepare future co-teaching. As Padgham et al. have pointed out, local African faculty members would also need access to resource packs, teaching workshops, and mobility programmes to equip them with the skills to integrate climate change relevant content into their regular courses and degree programmes.[51] In addition, more discussion and exchange of ideas as well as closer cooperation between local and international lecturers, the Faculty of Education, and the university administration would be essential to ensure that the programme can stand on its own two feet in the near future.

UTG's ownership of the programme was limited, however, because decisions over the extension of core funds and student recruitment were not taken within the university's own structures but at higher multilateral levels. A multi-donor funding strategy as well as the opening up of other sources of funding, including moderate tuition fees, are potential strategies to increase UTG bargaining power.

8   Outlook

There are still few master's and doctoral programmes in Africa that specialise in climate change. As such, graduating with a climate change degree suggests that graduates will have a comparative advantage over holders of other more conventional degrees. This is especially the case since climate change, as a cross-sectoral challenge to economic development, ranks high on the agenda of civil society and research organisations working in Africa as well as on that of national and international funders of research. There is thus a job market

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51   Padgham, Virji, and Seipt, "Promoting Climate Change Curricula," 170.

awaiting graduates who have learnt to work in interdisciplinary and transdisciplinary environments.

In addition to providing their graduates with international experience as well as language and intercultural skills, programmes such as UTG's MSc in Climate Change and Education can successfully building of expert networks across Africa. These may help to boost the role of African scholars as well as increase the quantity and quality of African research contributions to future assessment reports by the Intergovernmental Panel on Climate Change (IPCC).

As the discussion section has shown, establishing and sustaining an international programme such as UTG's MSc in Climate Change and Education comes with many practical challenges. Besides dependence on a single donor, other pressing challenges include divergent views on the objectives and content of the programme. At UTG (and probably also at the other WASCAL Graduate Schools), transformative learning was not yet a priority when designing the curriculum. However, as the director underlined: "We have learned a lot during the first years. Now we really need to get the opportunity to recruit more batches [of students] and make things work better. We know how to do it now." This is certainly true, irrespective of whether the UTG Faculty of Education will follow the call for a revolution in education and capacity building in response to global change. The observations also illustrate that the expectations expressed in the introduction, which underline the central role that African universities should have in facilitating transformative change and low-carbon development pathways, may be a bit too high, at least in the case of universities that are in a similar situation to UTG.

African ownership of master's and doctoral programmes also means that international partners need to respect the fact that their African counterparts may not subscribe to European educational agendas, as outlined by O'Brien et al.[52] African faculties may set different priorities in curricular development and may define different objectives for the master's programmes than those envisaged by the international funder or by European lecturers. This is fully legitimate, because it underlines the autonomy of the African universities, which despite receiving financial support should not be seen as implementing partners but as agenda-setting institutions in their own right.

Finally, considering the confusing mushrooming of climate change-related initiatives in Africa that aim to increase public education and transnational capacity building, it is also a valuable academic project documenting what pathways these take and how they work in practice.

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52   O'Brien et al., "You Say You Want a Revolution?"