The multi-front battle against climate change Diverse interventions by Commonwealth Scholars

to tackle a worldwide issue

Contents

4 The first word

5 Sustaining people and the planet

Ngao Mubanga explains how incentives such as carbon finance can drive sustainable agriculture management and forest conservation in Zambia and beyond.

8 Digging deeper: The quest to uncover and solve deforestation issues

Josiane Gakou Kakeu sheds light on pilot initiatives in Cameroon which aim to reduce emissions from deforestation and forest degradation.



10 Small islands, big barriers

Courtnae Bailey discusses the difficulties which the Caribbean Small Island Developing States currently face in securing financial investment for climate change adaptive projects, and offers several methods to attract more private investment.

12 Laying the groundwork

What impact is climate change having on the amount of carbon released by soil? **Adetunji Alex Adekanmbi** is providing data to improve the accuracy of these predictions, and in this article suggests regenerative agricultural methods to help retain carbon in the ground.

AND PROPERTY OF

14 Advocating for action

Sirazoom Munira shares insights into her role with the Climate Vulnerability Forum, Vulnerable Twenty, and Bangladesh's leadership on national and global climate change commitments, ahead of COP26.

16 Climate Change: More than a Single Issue

From agriculture to education to public health, the Commonwealth Scholarship Commission's Evaluation Team illustrate the breadth of the areas in which Commonwealth Scholars and Alumni are working as part of their efforts to tackle the far-reaching impacts of climate change.



18 Making waves

How can Rwanda achieve net zero carbon emissions while working towards its ambitious economic targets by 2050? **Emmanuel Mudaheranwa** explains how his set of renewable energy scenarios can provide a starting point for Rwanda's long-term planning.

21 Collaboration: the key to tackling climate change

Tackling the causes and effects of climate change successfully involves the concerted efforts of many organisations and individuals working in partnership with each other. **Sunday Sarah Fortunate** highlights her involvement in building relationships and accelerating the sharing of climate change knowledge among stakeholders across Uganda.



24 Pinpointing the problem

Carrol Margaret Helena Chan highlights the importance of Geographic Information Systems (GIS) in preparing for natural disasters in the Pacific.

26 Alumni news

- 28 Alumni events
- 30 Scholar events
- 31 Get involved

The first word

In 2015, in Paris, 196 nation leaders committed to a historic agreement to tackle climate change. They agreed to pursue efforts to limit the rise in the global average temperature to 1.5°C above pre-industrial levels, recognising that this will substantially reduce the risks and impacts of climate change.

The UK will host the 26th United Nations Climate Change Conference (COP26) in November 2021, against a promising backdrop of international commitment to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change.

Commonwealth Scholars act as catalysts for such global sustainable development, through their work which includes teaching thousands of others, creating jobs, discovering and promoting the use of new scientific techniques, and raising standards across a whole range of policy areas.

It is fitting, then, that this issue of Common Knowledge provides vivid testimony of the impact which our Scholars and alumni are having on urgent climate change issues today, and here we illustrate how climate change is not just the focus of one academic area of study. It is becoming increasingly clear that these drastic changes to our environment are affecting every sector and aspect of our lives, from finance and infrastructure to food availability, international diplomacy, energy production and disaster resilience.

Commonwealth Scholars study subjects within the six CSC themes of Science and Technology for Development; Strengthening Health Systems and Capacity; Promoting Global Prosperity;

Strengthening Global Peace, Security and Governance; Strengthening Resilience and Response to Crises; and Access, Inclusion and Opportunity. The climate change crisis has relevance across all these themes.

In this edition of Common Knowledge you will read articles from current Scholars and alumni studying and working across these diverse areas, some of which may not seem to be obviously related to the environment at first glance. We learn, though an article on plant respiration and subsequent carbon release in soil by Adetunji Adekanmbi, how higher maximum daily temperatures are contributing to a vicious cycle of increased carbon release which could be, in turn, accelerating climate change. Economics graduate Ngao Mubanga explains the importance of understanding the socio-economic drivers and incentives that underlie deforestation, and how financial incentives based on rewarding individual sustainable agriculture and forest management efforts lead to significant reductions in carbon emissions. And in the article 'Small Islands, Big Barriers', Courtnae Bailey highlights the risks which the Caribbean Small Island Developing States face in the wake of their existing debt levels and difficulty in securing private investment into disaster resilience projects, again exacerbating their vulnerabilities to climate change.

We know that there is tremendous expertise among our Scholars and alumni who are striving towards sustainable and climate-conscious solutions to development challenges. The Commonwealth Scholarship Commission applauds the vital work of this next generation of leaders in climate change research and action implementation. Commonwealth Scholars are on the frontline, highlighting and addressing the most urgent needs in our global society.

The Secretariat has a number of activities planned to showcase and support the work of our Scholarship community in the area of tackling climate change throughout 2021. If you have not already done so, we invite you to join us in the first of these activities - to pledge a commitment to how you are helping the environment through an individual activity. Post your example on social media under the hashtag #ourclimatepledge and we would be delighted to help you spread awareness of how the actions of every individual, when joining in fighting for a common cause, can contribute towards a safer, more sustainable, and more resilient future

Professor Morag McDonald **CSC** Commissioner

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for all.

Sustaining people and the planet



Ngao Mubanga, an Environmental Specialist working with The World Bank, explains the main driving forces of deforestation in Zambia, and argues for the use of sustainable agriculture management and forest conservation through incentives such as carbon finance.



Sustaining People and the planet



Ngao Mubanga

2014 Commonwealth Scholar from Zambia MSc Economics with reference to Environment and Development SOAS, University of London

Over 250,000 hectares of forest is lost per year in Zambia, which is one of the highest rates of deforestation in the world. The drivers of deforestation include unsustainable agricultural expansion, charcoal production as a source of household fuel, forest fires, and a growing population.

The majority of the country's population live in rural areas characterised by high levels of poverty and there is a high dependence on renewable natural resources, such as forests, wetlands, fisheries, and water as a source of livelihood, income, and employment. The increasing dependence on these resources, coupled with unsustainable human practices, has had a significant and damaging impact.

The call for suitable management of natural resources must be considered alongside the livelihood options for the people who depend on these resources. Even though there is increasing awareness that deforestation and forest degradation, together with agriculture and other types of land use, are among the major contributors to global greenhouse gas (GHG) emissions, many forest-dependent communities simply do not have viable livelihood alternatives to turn to. It is therefore important to fully understand the drivers and incentives that underlie deforestation.

Ideal vs reality: Pushing the agenda

As an Environmental Specialist working with the World Bank, I have supported projects aimed at promoting sustainable agricultural management and forest conservation. Results from these interventions have shown that climate mitigation and socioeconomic development can be simultaneously achieved through the active participation of the private sector and local communities.

In this role, I have had the opportunity to draw a line between the ideal situation and reality. As we push the agenda for sustainable forest management, it is important to also understand the hard choices communities in rural areas must make. Cutting down a tree for charcoal production is an important source of income for many living in rural areas. Leaving the tree for environmental reasons will result in a loss of income and have a significant impact on livelihoods. This is a harsh reality that most policy makers and environmentalists must navigate to get the best results for both. Through working with the World Bank in Zambia, I have had the opportunity to support an initiative that seeks to address this gap through a carbon finance initiative.

Integrating communities to encourage better resource management

In 2015, a pilot project was commissioned by the World Bank in partnership with the private sector organisation Community Markets for Conservation (COMACO), which aimed to link sustainable agriculture and forest conservation with resultsbased payments in response to the challenges of deforestation and unsustainable use of natural resources. The pilot was a Carbon Offset trust-funded project, to which the private entity signed an Emission Reduction Purchase Agreement (ERPA) with the World Bank, with the aim of reducing GHG emissions through the sustainable management of land traditionally devoted to community activities, through both agricultural and non-agricultural interventions. The project was to deliver a target of 265,578 tCO2e Emission Reduction (ER), measured in tons of carbon dioxide equivalent gases (CO2-e), and the expected carbon credits (measurable emission reductions from climate action projects) were valued at USD 1 million.

The project was undertaken in the Eastern Province of Zambia, which has a poverty incidence rate of 70%. The project sought to increase agricultural production, link farmers to markets, and reduce GHG emissions through the adoption of sustainable, climate-smart agricultural practices, and conservation of forests in community areas, also known as Reduced Deforestation and Forest Degradation (REDD+) and Sustainable Agricultural Land Management (SALM). My role in the project was to provide technical support to the implementing entity and to ensure

As we push the agenda for sustainable forest management, it is important to also understand the hard choices communities in rural areas must make.

that community activities contributing to ERs would result in good land use practices.

A total of 19,399 smallholder farmers within nine chiefdoms in the Eastern Province were included in the pilot and adopted sustainable land-use practices such as agroforestry, residue management (for example, cessation of residue burning), alley-cropping, and reduced tillage. This has resulted in improved productivity on selected crops, particularly during normal agriculture seasons, while maintaining average productivity in seasons characterised by unforeseen shocks such as droughts.

Following successful implementation of the project, in 2018 participants were awarded with carbon payments for their sustainable agriculture and forest management. The communities received approximately USD 70,794 in carbon payments for ERs achieved through practicing SALM and REDD+. Approximately 111,245 hectares of forest have been protected from deforestation and degradation through this intervention, and 128,375ha brought under sustainable agriculture and forest management. This resulted in a total of 264,578 tCO2e (verified by a third party) GHG emission reductions for the project. This emission reduction corresponds to taking 57,160 passenger vehicles off the road for one year.

'The icing on the cake'

Following the project, the communities we worked with have come to appreciate the value of sustainable forest management as it directly links to their livelihood. With continued adherence to the practices, crop productivity has increased, and farmers are able to produce enough food for household consumption and sale, thereby reducing their over-dependence on natural resources.

In addition to these interventions, another key aspect of the project was the introduction of a model that links farmers to markets through the private sector. In turn for promoting sustainable agriculture and forest management among communities, COMACO buys the sustainably-produced food products from the farmers at a premium price and sells these under 'It's Wild!' brand to retail chains, institutions, and other customers in Zambia. With a market that is ready to buy, this model assists farmers in increasing their compliance with market standards and financially benefit from sustainable agricultural practices. Even before the mention of carbon payments, one of the participating farmers shared during the carbon payment ceremony that 'the carbon payments were just the icing on the cake', as they had already benefitted from the sale of the products at a premium price. Farmers have been able to increase their income in a sustainable way due to the increased productivity and yields. Such initiatives have also meant that communities are now invested in preserving trees for environmental purposes rather than cutting them down, while enjoying the benefits of sustainable natural resource management.

Building on lessons from the field

As this project shows, carbon finance can be the bridge that integrates sustainable natural resource management and promotes sustainable rural livelihood options. However, dependence on funding from the donor community on projects may not be possible. To ensure the long-term financial sustainability of these practices, it is recommended that they are mainstreamed within country programmes.

A strategy is therefore needed to improve compliance for sustainable natural resource management. Firstly, the proper valuation of accounting for natural resources is crucial for robust development planning, in addition to subscribing to programmes that promote sustainable management of these resources alongside community and public awareness of the benefits. Secondly, natural resource users across diverse livelihoods need to collaborate to integrate long-term sustainability, while promoting solutions that can support rural livelihoods and deliver positive environmental outcomes simultaneously.

Disclaimer: The views expressed in this article do not reflect those of my employer, The World Bank.



Digging deeper:

The quest to uncover and solve deforestation issues

Following field investigations in 2019, **Josiane Gakou Kakeu** sheds light on the successes and limitations of REDD+ pilot initiatives in Cameroon, which aim to reduce emissions from deforestation and forest degradation.



Photo showing some of the beneficiaries of a REDD+ pilot scheme



Josiane Gakou Kakeu 2017 Commonwealth Scholar from Cameroon PhD in Climate Change and the Environment University of Leeds

Deforestation and forest degradation are among the leading causes of climate change, as these actions are responsible for approximately 15% of global greenhouse gas emissions.

Addressing emissions from the forest sector has therefore become a priority for the international climate change stage. To mitigate forest emissions, the United Nations Framework Convention on Climate Change (UNFCCC) introduced a programme named REDD+ (Reducing Emissions from Deforestation and forest Degradation) in 2007. REDD+ aims to financially compensate forest-rich low-income countries which are willing to address the issue of forest clearing.

With over 22 million hectares of forests, Cameroon is home to one of the largest forest areas in the Congo Basin. However, the pressing need for poverty alleviation and economic recovery through agricultural expansion, logging, mining, and infrastructure development have put a strain on the country's forests. The Cameroonian government joined the international REDD+ initiative in 2007 and has hosted various REDD+ pilot projects to curb forest cover loss, but in a context where global initiatives often poorly fit with local realities, I undertook to investigate the factors that may affect REDD+ implementation in Cameroon. I used three REDD+ pilots as case studies; these were selected to cover distinct ecological zones and a range of REDD+ activities, as well as diverse sociocultural settings.

The three REDD+ pilot projects

The first pilot had been deployed between 2009 to 2015 in the dense forest village of Nkolenyeng in Southern Cameroon, where households practice slash-and-burn agriculture, and harvest trees and non-timber products from the community forest. The forest emissions reduction project implemented in Nkolenyeng aimed to slow the clearing of the community forest. Led by the Center for Environment and Development, a local NGO, and funded by the UK Department for International Development (now known as the Foreign, Commonwealth & Development Office or FCDO), the project provided improved seedlings to local farmers to increase farm productivity and reduce farmland expansion into the forest.

The second project was implemented in Efoulan village in the same region, by the International Union for Nature Conservation with funding from the Danish International Development Agency; it ran from 2013 to 2017. Community members were trained in improved agricultural practices, such as how to clear the farm without burning and how to perform seed selection. They learned how to maintain a tree nursery and were taught tree regeneration techniques such as seeding, stem cutting, layering and grafting. They were further taught crop fertilisation and supplied with improved crop seeds to enhance agricultural productivity and cease the slash-and-burn cultivation method.

The final pilot ran from 2015 to 2019 in the grassland region of West Cameroon, within the Bana-Bapouh forest reserve. Pastoralists in this area practice burning to stimulate grass growth for cattle, and the forest is also under pressure by unauthorised logging, overgrazing, farming, and expanding settlements. The REDD+ pilot aimed to halt forest clearing and support the restoration of the reserve, with funding from the French Agency for International Development and under the coordination of the National Participatory Development Program. As part of the project, farmers were provided with improved seeds to increase crops' productivity. Livestock keepers were also taught how to cultivate grass for cattle.

Investigations and findings

To explore how the globally-led REDD+ initiative fits with local realities, I held focus group discussions with project beneficiaries in all three sites and conducted interviews with community leaders, council officials, forest companies, and officers from the forestry, agricultural, and husbandry sectors.

Investigations revealed knowledge discrepancies between project designers and local communities. A key goal of Cameroon's REDD+ strategy and pilot projects is to eliminate smallholders' shifting agriculture, which is considered a main driver of deforestation as plots of land are cleared and cultivated temporarily, then abandoned for another plot while the soil recovers through fallow vegetation.

While participants from the less-forested West region recognised that smallholders' livelihoods put pressure on the forest reserve by clearing the woods for new lodgings, for wood energy and from frequent bush fire by pastoralists, local communities in the dense forest sites claimed that

large scale agriculture and industrial logging clear larger forest areas. They further suggested that burning farms eases clearing, eliminates shadowing of crops and fertilises the land, and that yields are higher in newly converted forestland. Farmers also found tree nursery activities quite complicated: while they adopted local tree species, they abandoned other species such as citrus plants

The pressing needs for poverty alleviation and economic recovery through agricultural expansion, logging, mining, and infrastructure development have put a strain on the country's forests.

which need frequent maintenance and treatment, and which they found laborious and costly.

This research further showed that forestry institutions have considerable impacts on the effectiveness of REDD+ activities, and that these originate from the rules regarding timber processing and reforestation. The 1994 Cameroonian Forestry Law sought to increase local timber processing through tax incentives, restrict the export of unprocessed round logs, and compel logging companies to set up local wood processing facilities. Local wood processing supports livelihoods and eases pressure on forest resources. However, the closure of a major wood factory in the South shed jobs and paved the way for organised tree theft, with adverse effects on sustainable forest projects in the South.

According to the 1994 Forestry Law, reforestation sites have been set up with the aim of providing forest products and/or to protect fragile ecosystems. The Bana-Bapouh forest reserve in West Cameroon was planted with eucalyptus to prevent landslips. The plantation negatively affected local livelihoods, which in turn eroded adherence to REDD+ reforestation activities. Locals suggest that eucalyptus has several detrimental effects on both farming and animal husbandry, including heavy water absorption and causing land dryness.

In conclusion, the success of REDD+ schemes would be boosted by improving forest governance and enforcing incentives which support the local timber processing industry, enhance rural living conditions, and alleviate the pressure on forest resources. As with most centrally designed and locally implemented initiatives, forest emission reduction projects would also benefit from reaching out across different stakeholder groups to take local knowledge into account and to resolve the issue of knowledge discrepancies. Furthermore, policy designers' ability to propose alternative livelihood practices that meet implementers' preferences and mitigate labour implications and other unintended

consequences are key to addressing emissions in the forest sector. REDD+ pilots have targeted smallholder farmers; while the rise in rural population densities did drive deforestation across a wide range of settings, technological development and increased access to heavy farm machinery imply that the well-capitalised farmers will soon assume a major responsibility for deforestation; steps should therefore also be taken to steer agricultural modernisation onto a sustainable trajectory. CK



Small islands, big barriers

Courtnae Bailey discusses the difficulties in securing financial investment for climate change adaptive projects within the Caribbean Small Island Developing States, and suggests ways to attract private investment which will, in turn, help build resilience to climate change.



The Caribbean Small Island Developing States (SIDS) are responsible for less than 1% of global greenhouse gas emissions but are disproportionately among the most vulnerable countries to be impacted by climate change. Climate change and its associated impacts such as sea-level rises, increased temperatures, changes in rainfall patterns, and the increased intensity and frequency of storms, threaten the development of these countries by affecting key economic sectors. These sectors include tourism and agriculture, which Caribbean economies are dependent upon. According to the International Monetary Fund, climate disasters cost Caribbean SIDS USD 0.5 - 1.5 billion in damages annually. It is estimated that the average potential economic impact of climate change on the Caribbean SIDS can range from approximately 5.6% of gross domestic product (GDP) or up to 34% of GDP depending on the level of global action to reduce emissions. The implications of climate change on the Caribbean SIDS includes loss of livelihoods and debt accumulation, which will only increase social inequalities and vulnerabilities, therefore threatening the efficacy of its development investments. Investment is urgently required to prevent a damaging negative cycle which will exacerbate existing development challenges, such as social inequalities and high debt, the latter of which affects countries' ability to attract investment and access finance to address these challenges.

Barriers to investment

Climate change adaptation (which is the process of adjustment to actual or expected climate effects to enhance adaptive capacity and build resilience) is critical to reducing the costs of climate-related disasters and preserving sustainable development in these Caribbean countries. Building resilience to climate change will require investment in climate-resilient infrastructure. This is particularly necessary in the Caribbean SIDS as approximately 70% of the population, in addition to development sectors including critical infrastructure such as airports, seaports and roads, are located along the coast and are vulnerable to rising sea levels.

However, financing climate change adaptation activities such as investing in infrastructure remains a challenge for Caribbean countries. SIDS are amongst the most vulnerable to experiencing multiple hazards, and according to the UN in 2015, Caribbean SIDS have high fiscal debt, with an average debt to GDP ratio of approximately 73%.

In addition, many of the Caribbean countries are ranked as medium to high income countries, which restricts their access to lower interest concessional loans. The combination of these three characteristics results in a high-risk categorisation of these countries, and the high-risk perception makes government borrowing to finance infrastructure difficult and unsustainable. High interest rates are applied to debt-based financial instruments, which in turn exacerbates existing debt levels. The high debt levels of these countries have fuelled the threat to sustainable development.

The combination of climate change effects and fiscal constraints has the potential to undermine efforts to eradicate poverty and develop economies. Thus, it has become difficult to finance adaptation from domestic and public budgets only. Financing resilience in the Caribbean will therefore require greater engagement of the private sector. However, the market characteristics such as high debt, the scale of projects The high debt levels of these countries have only fuelled the threat to sustainable development.

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Greater debt and risk perception Greater difficulty in attracting investors

and the high vulnerability level makes it difficult to attract private investment, as most private investors are risk-averse.

Attracting private investment will require a whole system approach to climate change, which includes building institutional capacity to design projects, creating an enabling environment for investment, and most importantly creating 'bankable projects' – projects which can be promoted as offering high returns on investments.

Attracting investment via sustainability commitments

The importance of finance in achieving sustainable development and protecting communities against the impacts of climate change became evident to me during my Master's in Hydrology and Water Resources Management at Imperial College London. I set out to identify ways in which this existential threat of climate change can be managed in such a way that we are able to build resilience to the impacts of climate change and realise opportunities for development in the Caribbean region.

My research thus far has identified several changes required for Caribbean SIDS to sustainably invest in resilience. These include changes to the way in which adaptation projects are assessed, where the value of resilience in reducing risks needs to be accounted for to enhance the attractiveness of the project to investors. Another change to consider is sovereign ratings methodologies. Many of the ratings agencies' current approaches to climate risks results in increased cost of borrowing for SIDS. To make borrowing more attractive for Caribbean SIDS and reduce the risk perception among investors, it will help if ratings agencies take into account countries' resilience efforts in the context of risk reduction. Furthermore, there are various types of financial instruments that can be used to finance adaptation, and the use of evolving financial instruments such as results-based financial instruments (including sustainability-linked loans) would be required to assist in increasing fiscal space and transferring returns to investors.

The opportunity lies in developing innovative financing mechanisms which account for SIDS' vulnerabilities and their commitments to resilience. Rather than penalising their vulnerabilities with higher interest rates, it can be used to help these countries develop. The developments in sustainable finance where the private investors are increasingly valuing sustainability and social impact presents an opportunity for climate change adaptation and resilience to attract the quality and quantity of investment required for transformational change.

My work therefore looks at how the benefits of adaptation (which are often reserved for the country or region within which it is conducted) can be transferred to private investors using the SDGs, and in turn how the use of such methodologies can take advantage of the developments in sustainable finance to attract investment. The solutions to these challenges extend beyond the scope of my research as they rely upon factors such as shifts in financial markets. I hope however that my work can contribute to part of the solution and feed into some of the impressive initiatives that are being developed to address the adaptation finance gap, such as the Adaptation Action Coalition recently launched by the UK government and the Coalition for Disaster Resilient Infrastructure (CDRI), and the Coalition for

3 GOOD HEALTH AND WELL-BEING

Laying the groundwork

Adetunji Alex Adekanmbi explains how his work will increase the accuracy of the predicted impact which environmental change will have on the further release of carbon stored in soils, and how regenerative agricultural methods can mitigate the acceleration of climate change by helping to retain carbon in the ground.

Soil is a major reservoir of organic carbon and provides a rich habitat for organisms. The top metre of soil, measured globally, contains three times more carbon than our entire atmosphere. Human activities, in particular agriculture, can cause carbon to be released from the soil at a faster rate than it is replaced, and remain the major sources of carbon dioxide (CO2), methane, and nitrous oxide release. As greater levels of CO2 in the atmosphere lead to higher air temperatures due to the 'greenhouse effect', these higher temperatures lead to more carbon being released from the soil, which further warms the air.

The quantity of organic carbon in soil is governed by the rate of carbon which is added through plant residues, including roots and root exudates (the suite of substances that are secreted by the roots of living plants), organic amendments, and the rate of carbon losses. The main way by which carbon is lost from soil is via CO2 release during the respiration of microbial organisms as organic matter (other than plants) decomposes in soil. Changes in soil temperature and moisture, which are generally influenced by climate, largely control the amount of soil respiration and CO2 emissions. Climate change (which is a change in global or regional weather patterns) has been occurring across the globe, and is still expected to occur in such a way that will influence soil respiration and CO2 emissions in the future.

There is a growing global interest in understanding the biogeochemical mechanisms that regulate exchanges of carbon between the land and atmosphere, and how these exchanges will respond to future climate change. Accurate data on soil microbial respiration is necessary to calculate the soil's carbon removal rate and the ecosystem's carbon balance. Without an understanding of these results, any mitigation action towards the impact of climate change on CO2 emissions will be difficult.

Land use type, temperature, humidity, nutrients, and vegetation (depending on the local and regional climate and hydrology) are the key drivers of greenhouse gas emissions. Improving the management of soil in a way which optimises these variables can therefore help the storage of carbon and enhance soil fertility and productivity, while buffering both crop and pasture systems against the impacts of climate change.

Agriculture remains the main source of livelihood to most Nigerians. 87% of households in rural areas practice crop farming while 56% farm livestock. It is therefore important to build capacity in assessing how agricultural activities in Nigeria could impact soils and the resultant effects on greenhouse gas emissions. I took it as a personal challenge to chart this course.

The impact of climate change on carbon release

My PhD research at the University of Reading in the UK explores the complex mechanisms by which soil microbial communities perform functions that mineralise soil organic matter and release CO2 into the atmosphere.

Whereas laboratory incubation studies which evaluate the temperature sensitivity of soil respiration frequently test with constant incubation temperatures, they do not represent the real-life situation, where soils undergo oscillations in temperature throughout the day.

My unique work investigates how soil microbial communities react to different patterns of temperature change both in the laboratory and in the field. I am also discovering how these microbial communities performing such functions respond and recover from disturbances and perturbations caused by extreme climatic events. The overall aim of my research is to provide data to increase the accuracy with which we can predict the impact that climate change will have on the further release of CO2 from carbon stored in soils into the atmosphere.

The overarching findings from my PhD research showed that soil microbial communities thermally adapt to the daily maximum temperature within laboratory-controlled conditions in terms of their CO2 release. This implies that the maximum temperature, rather than the minimum or average temperatures, is more important when predicting My findings showed that the maximum daily temperature, rather than the minimum or average temperatures, is more important when predicting the response of soils to warming.

Adetunji Alex Adekanmbi

2014 and 2017 Commonwealth Scholar from Nigeria MSc Soil Science; PhD Soil Science University of Aberdeen



the response of soils to warming. Climate change experiments and the analysis of climate model predictions regarding the mechanisms underpinning the response of soil microbial functions to warming now need to adopt relevant daily temperatures, such as maximum and minimum daily temperatures.

Further to the laboratory experiments, I initiated a warming experiment in agricultural plots to also examine the warming effect under field conditions where carbon sequestration (the capturing and storing of carbon) methods are being practised. I found that use of regenerative agricultural practices, such as planting cover crops as a means of carbon sequestration, reduced soil warming. This effect implies that the degradation of soil carbon and subsequent CO2 emissions can be regulated using such practices.

Prior to my PhD research project (and after I returned from Aberdeen following my MSc Soil Science programme), I led, in collaboration with senior colleagues, a team of undergraduate students of Federal University of Technology Minna, Nigeria in an innovative research project. We explored the use of organic amendments to substitute inorganic fertiliser in

legume systems. In the project, we tested effects of biochar generated from agricultural bio-wastes including corn cobs, sawdust, swine dung and poultry manure. Biochar is produced when organic material is burned at high temperatures with little or no oxygen availability. The resultant biochar products enhanced the growth and nitrogen-fixing potentials of soybean and cowpea grown in the Guinea savanna soils of Nigeria, which are known to be depleted of carbon and nutrients. This effort is a sustainable means of producing legume crops, and an alternative to use of inorganic phosphorus fertiliser - the production of which releases a greater amount of carbon emissions. The use of biochar also helped in carbon storage in a way that can mitigate CO2 emission. This is because biochar contains about 80% carbon, and around 60% of this organic carbon is stable in soil and can resist decomposition.

Future growth

As demonstrated by the findings of my PhD

research, other research endeavours, and current trends, we are in dire need of regenerative agricultural practices that can help enhance agricultural productivities. Incorporating such practices into current farming systems in Africa, and especially in Nigeria, will help promote sustainable soil use and management in the face of global environmental change. I am very keen to further assess the resilience and global warming potentials of current farming systems in Nigeria and other parts of Africa in collaboration with other scientists, based both in Africa and elsewhere. I also intend to research more regenerative agricultural practices in Nigeria and Africa to promote sustainable soil use and management while enhancing carbon storage and crop nutrient availability, and while reducing greenhouse gas emissions.

By uncovering more mechanisms by which nature interacts with soil organisms, soil biogeochemical processes, and other natural agents, we can help regenerate degraded landscapes and further build resilient soil for the future. In the longterm, I will seek opportunities to assist governments in policy formulations which can help mitigate greenhouse gas emissions, decrease environmental degradation, and promote sustainable soil use and management.



Photo of Adetunji monitoring soil temperature inside an Open Top warming chamber at Sonning, England (Credit: Tom Sizmur)

Advocating for action

Commonwealth Alumnus **Sirazoom Munira** is currently supporting the Government of Bangladesh in its ongoing Presidency of the Climate Vulnerable Forum (CVF) and Vulnerable Twenty (V20) as a Programme Officer for the CVF and V20 support program of the Global Center on Adaptation (GCA) based in Dhaka. In this article, she shares insights into her role with the CVF and V20 and Bangladesh's leadership on national and global climate change commitments, ahead of COP26.

The Climate Vulnerable Forum (CVF) is an international partnership of countries which are highly vulnerable to a warming planet. The Forum serves as a South-South cooperation platform for participating governments to act together to deal with global climate change.

Founded in 2009, it currently comprises 48 member states, representing some 1.2 billion people from Asia, Africa, Latin America, the Pacific, and the Caribbean. CVF has been representing the commonly-held priorities of vulnerable countries by driving the 1.5 degree goal which lies at the heart of the Paris Agreement and ensuring that the goal is delivered by international communities. In 2015, CVF established the V-20, a dedicated international collaboration of finance ministers tackling the climate crisis by mobilising economic responses and programmes to leverage public and private finance for enhanced responses.

The CVF and V20 are led by a 2-year rotational Presidency and, for the second time, Bangladesh has assumed Presidency for the 2020-2022 term, under the leadership of Honorable Prime Minister (HPM) H.E. Sheikh Hasina as the Forum's Chair. The Forum is supported by a dedicated Secretariat, hosted by the Global Center on Adaptation (GCA), a new international

organisation with regional offices in China, Bangladesh and Côte d'Ivoire, dedicated to the challenge of adapting to climate change and headed by former UN Secretary-General Ban Ki-moon. It works hand in hand with the CVF and V20 due to its hosting of the Forum's secretariat.

An urgent need for action

Extreme climate events in Bangladesh are responsible for an approximate loss of 2.5% in GDP each year. While the country has made robust progress Under the leadership of the key ministries, we are advocating towards strategic, low-carbon investment frameworks to be integrated into national development plans which will stimulate Bangladesh's growth and prosperity.

in developing disaster-resilient infrastructure in recent years, its ability to bounce-back is constrained by several contextual realities, which are compounded by the COVID-19 health emergency and an influx of 1.1 million Rohingya refugees. Despite these issues, Bangladesh is increasing its collective ambitions with its own resources, establishing the Bangladesh Climate Change Trust Fund (BCCTF), worth USD 450 million, supporting 800 adaptation and resilience projects, and investing 2.5% of our GDP on average to the same.

As a result of Bangladesh's leadership in issues related to climate change, the GCA inaugurated its South Asia Regional Center in Dhaka to forge regional and global partnerships, including the CVF. This year, I joined the GCA in its global support program to the Forum as the primary liaison point with the Bangladesh presidency across the breadth of the CVF and V20 streams of work. My role includes analysing intergovernmental policy processes, arranging representational

> engagements with liaison focal points, and conducting cuttingedge research to support the CVF Special Envoy, Mr Abul Kalam Azad, and Expert Advisory Group in ensuring effective implementation of CVF activities.

My ongoing activities supporting the Presidency are focused on realising its priorities for COP26, with other key aims both domestic and international. These activities include taking urgent action to combat the climate emergency by safeguarding the 1.5 degree

Sirazoom Munira

2015 Commonwealth Shared Scholar from Bangladesh MSc in Risk and Environmental Hazards Durham University



goal under the Paris Agreement, and support the promotion of a successful United Nations Framework Convention on Climate Change (UNFCCC) COP26 outcome. These priorities are also championed by CVF Thematic Ambassadors, which include Former President of the Maldives Mohamed Nasheed (who represents the theme 'Ambition'), Senator Loren Legarda ('Parliament'), Tosi Mpanu-Mpanu ('Renewable Energy'), Kathy Jetnil ('Culture'), and Saima Wazed Hossain ('Vulnerability').

Advocating through the CVF

Within the CVF Presidency, we are working closely with the permanent missions of the Bangladesh government worldwide, primarily with the Bangladesh High Commission (BHC) in London and the Commonwealth Secretariat, through which we propose to host a CVF-Commonwealth Heads of State, Government or Delegation level dialogue at the sidelines of the Commonwealth Heads of Government Meeting (CHOGM), which at the time of writing is due to be held in June 2021.

With the support of the permanent mission of Bangladesh to the UN Office in Geneva, CVF organised joint global events on climate change priorities involving health, human rights and labour, and has advocated for the creation of a dedicated UN Special Rapporteur on climate change and human rights to promote ambitious, rights-upholding climate action. The CVF Parliamentary Forum is also under active development in order to foster active collaboration of Members of Parliament across CVF states to foster a legislative framework and a unified political manifesto to pursue the planetary prosperity agenda, maximise resilience, and achieve other CVF goals.

After witnessing major economies failing to upgrade their Nationally Determined Contributions (NDCs), CVF Chair HPM H.E. Sheikh Hasina launched the 'Midnight Survival Deadline for the Climate', which called for all nations to deliver on the Paris Agreement with enhanced and updated NDCs by the agreed 'survival deadline' of 31 December 2020. Over 70 governments came forward with revised NDCs, however all climate-vulnerable countries wish to see all G20 countries submit ambitious NDCs before COP26 and the Chair has called on all nations to strive to do more.

Leading by example

In October 2020, during the UN General Assembly, HPM H.E. Sheikh Hasina launched the Planetary Prosperity Agenda of the CVF and V20 and called for the development of Climate Prosperity Plans (CPP) to address the urgent need to attract new investments to drive prosperity, deliver progress towards members' 100% renewable energy, and stride towards maximal resilience. The Mujib CPP represents the first Plan in the climate-vulnerable countries' planetary prosperity agenda and is named after Bangladesh's Founding Father, Bangabandhu Sheikh Mujibur Rahman. Under the Plan, the Government has already planted 11.5 million trees and, under the leadership of the key ministries, we are advocating towards strategic and resilient low-carbon investment frameworks to be integrated into national development plans which will stimulate Bangladesh's growth and prosperity.

Going forward

My journey with the CVF Presidency has been one that has allowed me to contribute to strong long-term impact to forge both national and international development - just as I had envisioned as a returning Commonwealth Scholar to Bangladesh from the UK. Undeniably, the Commonwealth Scholarship had a multiplier effect in my professional development as it opened doors to many new opportunities. With my appointment to represent GCA and work with South Asia Regional Office, I am living my dreams to help make a difference in the lives of the climate-vulnerable communities across the world. I owe a large part of my learning to working with our outstanding CVF and V20 global team, as together we continue to support the ongoing CVF Presidency of the Bangladesh Government and tackle this unprecedented climate crisis with a common purpose and with our common voice. CK

Climate Change: More than a Single Issue

Examples of work from our alumni:

"We developed a training module for women and climate change so that we could select women ambassadors from the community and build their confidence to become climate change advocates in their region. Finally, they put their stories forward at a national level workshop. This had a policy level implication to include more gender sensitive climate change policy interventions." "I give technical advice to countries on Comprehensive Disaster Management Outcomes, providing a stronger evidence base for the development of policy, legislation and country strategies that safeguard people, support sustainable development and build resilience against disasters and climate change."

2013 Commonwealth Doctoral Scholar

2015 Commonwealth Shared Scholar

Hundreds of Commonwealth Alumni have been engaged in work directly focused on environmental issues and climate change in recent years. However, the climate crisis is not a single-issue. It is multifaceted, affecting all aspects of our lives and requiring a broad, crosssectoral response. From agriculture to education to public health, these are just some of the other areas that Alumni are addressing as part of their environmental work.

natural disasters conferences government training policy advocacy infrastructure food community job creation equity and access economic multilateral agriculture gender urban teaching publishing rural energy science health outreach poverty youth research women education construction children university conflict rechnology Volunteering human rights

"My activities supported over 2,500 youthled businesses to develop and implement environmental action plans to safeguard the planet and ensure environmental sustainability, thus making the businesses socially responsible, environmentally friendly, and economically viable."

2014 Commonwealth Distance Learning Scholar

"I have conducted several research projects on assessing the agro-climatic characteristics and land suitability assessment for 10 major crops in coastal areas. The outcomes [are being] considered by policy makers to devise sustainable agriculture practices in the salinity-prone areas to cope with changing climate and sea-level scenarios."

2011 Commonwealth Doctoral Scholar

Making waves

Emmanuel Mudaheranwa explains how his set of renewable energy scenarios will contribute towards Rwanda's plans to achieve high-income status by the year 2050.



Emmanuel Mudaheranwa

2018 Commonwealth Scholar from Rwanda PhD in Engineering Cardiff University

In 2000, the Rwandan government launched its 'Vision 2020' development programme. Its main objective was to transform the country into a knowledge-based middle-income country over the next decade, thereby reducing health problems, and uniting the nation into a single democracy.

While serious progress has been made towards realising Vision 2020, the programme has been severely hindered by Rwanda's limited infrastructure, which includes the transport network, electricity grid, and water pipelines. It has been suggested that the expensive and unreliable electricity supply and low level of energy production are among the main factors limiting Rwanda's manufacturing and industrial development.

My research supports the development of Rwanda's energy system by proposing a set of Future Energy Scenarios (FES). The FES can be used to estimate the energy consumption and generation capacity up to the year 2050, and can provide a starting point for long-term energy planning. The scenarios consider key social, political and economic factors, the diversity of energy generation technologies and regional integration of these technologies, and Rwanda's potential success in adopting low carbon technologies. I analysed my FES through the utilisation of the 'Long-range Energy Alternatives Planning' system (LEAP), developed by the Stockholm Environment Institute, which includes several built-in tools to easily create complex models and projections, and was used to estimate the future of electrical energy in Rwanda for a period of 30 years (2020-2050).

I propose through the FES that it is possible for Rwanda to achieve net-zero carbon emission targets by 2050. However, in order for this to happen, I have identified that the retirement of fossil fuel-based power plants and an immediate adoption of electric vehicles (EVs) in the transport system is required.

The need for speed

Energy systems are rapidly transforming, with change supported by political, environmental, technological and consumer motivation. Currently, the installed electricity capacity in Rwanda is approximately 226.7 MW. This is not a low capacity when compared to the existing electricity demand. However, Rwanda risks low capacity in the near future, as the government target is to reach 100% electricity access by 2024, and so electricity demand will increase. The good news is that the capacity can be increased in the most environmentally-conscious way by utilising renewable energy, as explained in 'High Progression' scenario.

Rwanda has considerable amounts of natural energy resources, such as hydro, solar, peat, and gas. Despite substantial economic growth, its per capita electricity consumption is low (30 kilowatt-hours) compared to other countries within the East Africa Community (EAC). Since 2008, the country's power supply has grown by only 10%, while the annual peak demand grew from approximately 50 to 100 megawatts (MW) in 2019. There is therefore potential for both the supply and demand for electricity to increase, and my proposed solution is through developing the use of renewable energy sources.

As part of my FES, I have proposed three scenarios, although they are not by themselves a forecast of the expected pathways. The actual pathway adopted by Rwanda could be a combination of these scenarios, or any of them independently.

Future energy scenarios

Based on social, political, and economic influences, as well as the diversity of energy generation technologies, regional integration, and CO2 emissions, I have proposed several energy consumption and generation capacity scenarios based on a time frame from 2019 to 2050. The below FES are named based on the

progress of adopting low carbon technologies. They are separated into 'Basic progression', 'Medium progression', and 'High progression' adoption scenarios.

Within each scenario, the demand initially increases rapidly. The total annual electrical energy demand is projected to increase year-on-year from 2019, largely due to the electrification speed, as the plan is to provide 100% electricity access by 2024.

Energy consumption scenarios



Basic Progression: In this scenario, the total energy demand increases to around

7906 GWh. Due to policy, economic, and technological factors as well as customer perception, consumers are likely to adopt cheap but less efficient lighting systems. During peak hours, demand increases beyond the normal supply and requires additional supply from fuel-based power plants, which in turn contribute to a high increase in CO2 emissions.

Medium Progression: Here, customers are more inclined to purchase larger and more efficient appliances, due to factors such as increased availability and government policy which promotes the use (and distribution) of energy-saving devices. This results in a medium progression of low carbon technology adoption. By 2030, it is estimated that the use of EVs in Rwanda's transport system will start to raise the electricity consumption, and this will affect energy efficiency. This scenario represents the greatest scaling down in total energy demand, to just 6800 GWh by 2050, compared to the value of 7906 GWh in the basic progression scenario.



High Progression: My

findings show that in the high progression scenario, the total demand is the lowest by 2050 at 6,003.5 GWh. The factors which will lead to this low energy demand include the full adoption of demandside management programmes (to modify consumer demand for energy), a reduction in the average energy intensity of lighting, and an improved transport system.

Energy supply scenarios

Below are three scenarios for Rwanda's renewable electricity generation resources, which describe how the annual output from these resources could evolve up until 2050:



Basic Progression: In this scenario, the generation capacity increases to around

1350 MW by 2050. Low carbon technologies are adopted through greater use of available traditional electricity resources such as hydro, methane, peat, and biofuel, which in turn may help reduce Rwanda's potential emissions. However, dieselbased power plants are not expected to retire and so these will contribute to an overall increase in CO2 emissions.



proportion of renewable capacity grows in this scenario, but much more quickly starting

from 2020 compared to the basic progression scenario. My forecast within this scenario shows a decrease in diesel-based power generation but at medium speed, and there is a higher proportion of renewable energy generation. However, much of this generation is intermittent, since electricity is only produced during favourable weather conditions.



High Progression: A significant increase in hydro and solarpowered energy leads to a result where almost 100% of the

country's total electricity need is fulfilled by these sources by 2030. My results show a significant decrease in diesel-based power plants, and almost all plants are retired by 2044.

The above scenarios are dependent on electric transport being introduced in Rwanda by 2025. This deployment will significantly reduce the dependence on fossil fuels, and reduce CO2 emissions. It is expected that reaching close to net-zero carbon emissions by 2050 is achievable when the High Progression scenario is adopted.

Making waves

My research demonstrates that Rwanda has the renewable energy resources and potential solutions that can meet the projected electricity demand by 2050.



Photo of Emmanuel measuring the flow rate of a river to assess its hydro-power potential

Conclusions

Energy is principal to Rwanda's economy and development plans as it supports almost all the other sectors. An emissionsfree energy sector is therefore necessary to achieve the country's goals. My FES would support Rwanda's long-term energy sector planning and investment by identifying and promoting durable solutions which will improve Rwanda's clean energy output and support in mitigating climate change. The proposed FES also define a path for the delivery of low-cost energy for future consumers, while improving the contribution of the energy industry in adopting carbon emission reduction technologies. My research demonstrates that Rwanda has the renewable energy resources and potential solutions that can meet the projected electricity demand by 2050, and the current use of fossil fuels can be completely substituted with electricity from hydro combined with other sustainable energy resources. This is illustrated in my high progression scenario, where reaching around net-zero carbon emissions by 2050 is shown to be possible.

Collaboration: the key to tackling climate change



Sunday Sarah Fortunate, a Climate Change specialist, highlights her involvement in building relationships and accelerating the sharing of climate change knowledge among stakeholders across Uganda.

Uganda, like many countries, is disproportionately experiencing the effects of climate change. Since 2007, the country has experienced incidences of extreme weather patterns, such as prolonged dry spells, flooding, and landslides, and the reduced water levels of Lake Victoria, which has affected electricity generation and has led to massive nationwide power outages. Addressing climate change is critical for poverty reduction and sustainable development in Uganda.

Uganda's government has developed legal, policy, and institutional frameworks and strategies at the national, regional, and international level to create an enabling environment, which will move away from conventional development and transition toward a new paradigm that supports climateresilient sustainable development. The Uganda Vision 2040 and National Development Plans I, II and III recognise the need to address climate change through knowledge generation and dissemination across the country. Uganda's National Climate Change Policy also recognises the need for climate change education, research, and knowledge management. In response, Makerere University (MAK) spearheaded climate change action through its mandate: teaching, research, and outreach.

Establishing a climate science hub

In 2013, MAK's College of Agricultural and Environmental Sciences (CAES) established the Makerere University Centre for Climate Change Research and Innovations (MUCCRI), to strengthen climate change education, research, innovation,, information, and knowledge management within the university and nationally. MUCCRI's objectives are to promote climate change awareness, conduct and disseminate climate-related research and innovation, and influence climate change policy development to enable Uganda to better address climate change challenges.

From 2014 to June 2018, Family Health International (FHI) 360 implemented a four-and-a-half year United States Agency for International Development (USAID)-funded Feed the Future Activity, titled 'Education and Research to Improve Climate Change Adaptation' (ERICCA). ERICCA aimed to support CAES in establishing and operationalising MUCCRI as a recognised national and regional hub of academic, professional development, and research excellence in climate science, mitigation, adaptation, and related disciplines. From July 2016 to December 2017, I joined the FHI 360 team as a Climate Adaptation Specialist and Deputy Chief of Party (COP) for ERICCA. I deputised the COP in management, administration, and implementation of dayto-day activities, and was involved in developing strategic workplans, programme design and implementation, stakeholder management and partnerships, capacity building, research, and programme and financial reporting.

Creating a climate change network

As part of my role, I was responsible for coordinating the implementation of short-term training to external stakeholders to build networks and support MUCCRI in communicating and disseminating climate change adaptation information to an array of contacts across Uganda.

Alongside my ERICCA team, I built partnerships with a range of stakeholders, including the International Water Management Institute (IWMI), Food and Agriculture Organization (FAO), and United Nations Framework Convention on Climate Change and (UNFCCC) Regional Collaboration Centre Kampala, and provided both technical and financial support to MUCCRI to design and deliver cutting-edge short- and long-term training. The training was designed to increase climate change knowledge amongst students, staff, and external stakeholders, including public sector institutions, civil society and farmer groups, and create a community of climate-informed contacts to support the integration of climate adaptation and mitigation interventions.

In some cases, training was jointly designed and delivered by MUCCRI, ERICCA, external development practitioners, and academic staff for students from CAES, other MAK schools, universities, and stakeholders. This was intended to support the development of MAK as a 'climate smart' institution, with

Collaboration: the key to tackling climate change

Through observation and feedback, we assessed there was little interest in the basic science of climate change but rather the opportunities that its impact presents, such as how to mobilise climate finance to implement climate actions at a profit.

access to information and proven technologies, tools, and practices to support a solid academic foundation in climate change across the institution. The training included short courses and monthly lecture series, among others.

Climate Champions Programme

As part of the training for external stakeholders, we designed a Climate Champions Programme, targeted at the private sector, district environmental and natural resources officers, other local government district officers, civil society organisations, and farmer groups, among others.

Climate Champions were trained to provide advice and guidance to district local governments on the implementation of climate adaptation and mitigation measures and acted as regional 'go-to' individuals to provide accurate and useful climate change advice. They were trained to become a long-term channel of information dissemination in two directions – firstly, as a source of support to various levels of local government and other groups on responses to climate change; and secondly as a source of feedback or dialogue with researchers and policymakers to identify policy and community needs that may be addressed through research and/or policy/institutional interventions.

Initially, the biggest challenge we faced in implementing these activities was communicating the climate change research and information with farmers and the private sector workers, who predominantly had received little formal education but are key drivers of the economy, particularly within the agriculture sector.

Through observation and feedback, we assessed there was little interest in understanding the basic science of climate change but rather the opportunities that its impact presents, such as how to mobilise climate finance to implement climate actions at a profit. My team and I therefore changed the design and delivery of the training interventions and collaborated with other USAID-funded activities involved in market development to showcase the business opportunities that climate change brings and how to take advantage of them. We also delivered training sessions using local languages to increase accessibility.

As part of the Climate Champions Programme, we encouraged participants to identify transformative actions

they could implement within their communities at a profit and supported implementation through technical assistance provided by consultants on a case-by-case basis. No financial support was provided to the Climate Champion interventions to ensure sustainability post-completion of ERICCA.

The various transformative climate actions implemented include, among others: climate smart agriculture training and demonstration sites, such as the Jorumat Climate Change Innovation Centre of Uganda located in Masaka district, supporting Pearl Farm Ltd in Rakai district to operate under climate-smart agriculture principles which enabled it become an outgrower, local distributor, and demonstration site for climate-smart seeds; and awareness creation and sensitisation on how to adapt to climate change through radio programmes in Gulu and Iganga districts.

We later trained the initial 40 Climate Champions to, in turn, train and further inform their respective communities on climate change topics. To date they have trained over 400 individuals and five farmer groups of 20-40 members across Uganda.

Climate Youth Programme

Young people are important stakeholders in climate awareness and so my team organised climate youth training initiatives that now form the current MUCCRI Climate Youth Programme. We organised four annual youth climate change boot camps for university graduate and undergraduate students; climate change internships; field learning and research practicum programmes; and facilitated youth participation in the annual Kampala City Carnival.

Following the bootcamps, youth participants engaged in several climate change awareness activities, including treeplanting and implementing waste management activities at six universities, and developed climate change teaching materials and aids for secondary and primary schools, working with a curriculum development consultant provided by ERICCA. Approval for the integration of these materials into the national curriculum has been sought with the National Curriculum Development Centre (NCDC) of Uganda.

Through a three-month Internship Programme on Community Based Adaptation to Climate Change for undergraduate students, participants were equipped with skills and

Sunday Sarah Fortunate

2012 Commonwealth Scholar from Uganda MSc Climate Change and Development University of Sussex



knowledge in community-based adaptation to climate change and provided them with a practical understanding and field experience of working with smallholder farmer communities. The programme was undertaken in partnership with the Climate Champions and Civil Society Organisations involved in climate change programmes in the country who hosted the students. The internship focused on smallholder farming communities susceptible to drought and provided an opportunity for MAK to link teaching and research with the needs of communities involved in various climate change adaptation efforts in Uganda.

Partnership building for MUCCRI

An important aim of ERICCA was to establish MUCCRI as a national and regionally-recognised hub on climaterelated issues. During the 10th International Conference on Community-Based Adaptation (CBA), ERICCA successfully lobbied for MUCCRI to partner with the International Institute of Environment and Development (IIED) to co-host the next CBA 11 in June 2017, together with IIED and the Ministry of Water and Environment in Uganda. Participants from over fifty countries attended. During this conference, MUCCRI and the International Centre for Climate Change and Development (ICCCAD) launched the initiative on Least Developing Countries Universities Consortium for Climate Change (LUCCC). LUCCC is a South-South collaborative network of up to 10 universities based in LDCs that aims at enhancing research and education capacity and proficiency in climate change in their respective countries to empower them to build resilience. Working in partnership with

MUCCRI is currently supporting various research studies in partnership with several international and local stakeholders - and continues to be a key climate change stakeholder in Uganda. It is among those consulted in the revision of Uganda's current NDC (Nationally Determined Contribution). Additionally, a MUCCRI adaptation expert is currently involved in the development of Uganda's Long-Term Low Emission Development Strategies being developed collaboratively with revision of Uganda's NDC. Besides my involvement with ERICCA and MUCCRI, I have also been engaged in providing advisory services for governments. MUCCRI is currently supporting various research studies in partnership with several international and local stakeholders - and continues to be a select climate champions in the greater Masaka region, I coordinated MUCCRI's hosting of one of the CBA 11 field visits. Similarly, with support from my ERICCA team and I, MUCCRI also hosted a parallel CBA11 Youth Conference in partnership with the Food and Agriculture Organisation of the United Nations (FAO) and IWMI.

The impact of ERICCA's work on MUCCRI

My work and that of my team in implementing ERICCA has provided long-term capacity and sustainability of MUCCRI, which is now a fully operational and sustainable Centre and encourages campus-wide participation in climate change awareness activities. The Centre continues to engage the youth through a Climate Youth Programme and has since developed numerous partnerships. By completion of ERICCA, the climate champions organised themselves into the Uganda Climate Change Champion Network (UNCCCN), coordinated by MUCCRI, and individual climate champions continue to implement and have expanded their operations within their respective communities.

Students who participated in the various climate youth programmes have gone on to be employed in different organisations, including Kampala Capital City Authority, Red Cross International, and the World Wildlife Fund (WWF). One student has gone on to establish an NGO, creating climate change awareness among primary and secondary schools. These roles each contribute to closing the gap of climate change personnel in the country.

key climate change stakeholder in Uganda. It is among those consulted in the revision of Uganda's current NDC (Nationally Determined Contribution). Additionally, a MUCCRI adaptation expert is currently involved in the development of Uganda's Long-Term Low Emission Development Strategies being developed collaboratively with revision of Uganda's NDC. Besides my involvement with ERICCA and MUCCRI, I have also been engaged in providing advisory services for governments, civil society organisations, the private sector, and NGOs. I am currently part of Zutari (Pty) Limited Team as a National Mitigation Expert, assigned by Government of Uganda and UNDP to update Uganda's current NDC under the Uganda Climate Promise Consultancy Project.

Pinpointing the problem

17 PARTNERSHIPS FOR THE GOALS

Countries must develop systems to monitor, respond, and build community resilience in the face of intensified natural disasters and severe weather patterns caused by climate change. Commonwealth Alumnus **Carrol Margaret Helena Chan** highlights the importance of Geographic Information Systems (GIS) in preparing for natural disasters in the Pacific.



As a young Pacific Islander, I have always been drawn towards a career that could make a positive impact in disaster risk and climate change. Currently I am pursuing a PhD in Environmental Science using applied Earth observation data to determine the impacts of climate change on the spread of invasive species.

Prior to this and after the completion of my MSc at the University of Leicester, I was employed as a Geographic Information System (GIS) Project Assistant within the Geoscience, Energy and Maritime (GEM) Division in The Pacific Community (SPC), a regional technical and scientific multi-disciplinary organisation focused on improving the wellbeing of Pacific people. In my role, I provided geospatial support across divisional projects which ranged from disaster risk, land use monitoring, and mineral extraction.

Within the GEM Division there are three core programmes, Georesources and Energy, Oceans and Maritime, and Disaster and Community Resilience. Across all programmes it is evident that their work is related to disaster preparedness and climate change, directly or indirectly. Although a disaster programme has been in place for a period, there has been a shift in focus on building capacity in-country in a more sustainable manner, through utilising open-source tools and competency-based training dedicated towards disaster emergency managers and technical officers including surveyors, environmental officers, engineers, and geospatial analysts.

Introducing new analysis tools

As one of the few people in SPC who is trained in GIS and Remote Sensing, I contributed to the development and delivery of training materials which aim to increase the

Carrol Margaret Helena Chan

2016 Commonwealth Scholar from Fiji MSc Environmental Informatics University of Leicester

My experience and work have enabled me to successfully influence data-sharing policies [...] this has resulted in effective decision-making at ministerial levels on the distribution of postdisaster aid and the effective allocation of funding for rehabilitation and recovery.



technical skills of professionals in government departments across the Pacific region. Such training prioritises the usage of open-source tools and geospatial data management, and includes basic GIS for disaster management, data management, mapping for decision making, and undertaking geospatial analysis to better inform disaster managers in their planning and response efforts.

Following my Commonwealth Scholarship, I joined my first major project in GEM called the Partner Project, funded by New Zealand MFAT, working with the National Institute of Water and Atmospheric Research (NIWA), which had developed the tool RiskScape, a software application which assesses the socio-economic impact of natural hazards. As part of this project, we were able to introduce the tool in Samoa and Vanuatu to support their disaster planning, focusing on tsunamis, flooding, and earthquakes. A major portion of this project included training and capacity building to successfully implement the tool at a national level which involved the development of a regional training for trainers' curriculum. This included everything from defining disasters and disaster management, to basic GIS, and building an understanding of hazard model development.

Through the project, two national repositories were deployed in the disaster offices of Samoa and Vanuatu which had gained ministerial and government interest and support as to the importance of this tool and dedicated local human resources to implement and manage the information gained across sectors.

Promoting data-sharing

My experience and work have enabled me to successfully influence data-sharing policies within national departments so that there is a greater focus on open data, and so that access to data is prioritised during emergency events. This has resulted in effective decision-making at ministerial levels on the distribution of post-disaster aid and the effective allocation of funding for rehabilitation and recovery. For example, during Tropical Cyclone Gita in Fiji, and Tropical Cyclone Harold in Fiji and Vanuatu, within my role at SPC I provided data mapping and analysis to the National Disaster Management Office to inform relief efforts.

Following this I was a part of a team leading the geospatial data administration for SPCs Ridge to Reef projects' State of the Coast platform, which is a thematically unique geospatial data management system developed in the Pacific focused on socio-economic, governance, and environmental datasets. The project will centralise country datasets and streamline data collection methods to better support research across the region into areas including water quality and sustainable livelihoods, focused on climate resilience.

A further project, Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), involves the standardising of asset data collection to support quicker analysis in response to disasters, specifically tropical cyclones, and earthquakes, for country level insurance purposes. My role was collaborating to build and maintain a regional-wide geospatial asset data repository called the Pacific Risk Information System (PacRIS), which is crucial to host standardised asset and hazard data generated from the largest field survey exercise in the Pacific. This system and hosted data will contribute to impact forecasting, hazard analysis, and multiple other uses outside of the scope of PCRAFI.

Aside from the work that I do I am an avid supporter of the usage of free and open-source software (FOSS) tools in the Pacific and have been an active volunteer in this space. In late 2020, I was one of three hub managers that convened Fiji's first hub under the FOSS4G Oceania Conference, and am now the project lead for OpenStreetMap Fiji, which was recently created in March 2021. I see how the geospatial community is valuable to the Pacific for effective decision making in the disaster and climate space and am dedicated towards shifting practitioners' and decisionmakers' mindsets towards understanding the value and moving towards the usage of open data and open-source technology. I am also keen to encourage citizens to create data that will support infrastructure monitoring and disaster and climate preparedness through the greater use of technology. CK

Alumni news

The updates below (listed by year of award) summarise just some of the achievements of our global alumni. To let us know about your successes, email alumni@cscuk.org.uk



Ashis Kumar Dash



Dacia Leslie

1981

William John Torrance Kirby has been awarded a three-year Insight Grant by the Social Sciences and Humanities Research Council of Canada (SSHRC) for research on 'The Reception of German Mysticism in Early Modern England'. (Scholar from Canada, DPhil Modern History, University of Oxford)

1983

Marc Tessier-Lavigne has been appointed an Officer of the Order of Canada for his contributions to developmental neuroscience, renowned academic leadership, and advocacy of science. (Scholar from Canada, PhD Neurophysiology, University College London)

1990

Louise De La Gorgendière has

been awarded the 2021 Canadian Anthropology Society Award for Teaching Excellence. Her teaching and research focus on education, development, HIV/AIDS and women's rights, ethnopolitics, Ghana and the Ghanaian diaspora in Canada/UK, and immigration. (Scholar from Canada, PhD Social Anthropology, University of Cambridge)

2011

Ashis Kumar Dash was a finalist in the Study UK Alumni Awards 2021 in India in the Professional Achievement category. The awards recognise his work standardising the sustainability of the Indian mining sector and in supporting and leading efforts to implement the development goals within the mining sector. (Scholar from India, LLM Mineral Law and Policy, University of Dundee)

Dacia Leslie received the Principal's Award for Best Faculty of Social Sciences (FSS) Publication, for the Academic year 2019/2020 for her book, 'Recidivism in the Caribbean - Improving the reintegration of Jamaican Ex-prisoners'. (Scholar from Jamaica, PhD Criminology, Cardiff University)

Gayatree Ramlall was a finalist in the Study UK Alumni Awards 2021 in Mauritius in the Social Impact category. The awards recognise her 42 years working as a librarian and the establishment of 'Book a Smile', an NGO which aims at removing the barriers to reading and literacy within all age groups of Mauritians. (Scholar from Mauritius, MSc Library and Information Systems, Aberystwyth University)

2012

Saima Eman was a finalist at the Study UK Alumni Awards 2021 in Pakistan in the Professional Achievement category. The awards recognise her impact on female teachers' psychology scholarship, ethics, and career education, psychology researchers, and child education in Pakistan. (Scholar from Pakistan, PhD Psychology, University of Sheffield)

2013

Md Mohataz Hossain has been shortlisted for the Royal Institute of British Architects (RIBA) President's Awards for Research 2020. His submission addresses improving the workplace environment for garment factories in Bangladesh. (Scholar from Bangladesh, PhD Architecture: Sustainable Built Environment, University of Nottingham)



Gayatree Ramlall



Saima Eman



Devina Lobine



Michael Ofori

Devina Lobine is the winner of the Study UK Awards 2021 in Mauritius in the STEM Impact Award category. The award recognises UK alumni who have made innovative efforts to improve access to science, technology, engineering, and mathematics, or conducted innovative research and can demonstrate significant impact in the STEM community. In her roles as Ambassador of Next Einstein Forum, NEPAD-SANBio, and as a member of the Africa Science Leadership Programme and Global Young Academy, Devina actively promotes STEM opportunities and careers amongst women and young people. (Split-site Scholar from Mauritius, PhD Biotechnology, Durham University and University of Mauritius)

2016

Munir Moosa Sadruddin was a

finalist at the Study UK Alumni Awards 2021 in Pakistan in the Social Impact category. The awards recognise his work promoting human rights values in support of minority and marginalised communities. He aims to use radical approaches to break the prejudices and social constructs of academia through open educational praxis and low-cost technologies. (Distance Learning Scholar from Pakistan, MA Online and Distance Education, The Open University)

2018

Ikechukwu Ugwu has been named one of Bournemouth University's brightest young graduates (aged 29 and under) for their inaugural 30 under 30 campaign. He has published a series of articles to help share knowledge and increase understanding in environmental law protection and data protection in the era of AI. (Shared Scholar from Nigeria, LLM Public International Law, Bournemouth University)

2019

Runcie Chidebe has received the 2020 Global Ties US International Visitor Leadership Program (IVLP) Alumni Award for Social Innovation and Change. The award recognises high achievements for driving social change through innovation in the home communities of IVLP alumni. (Shared Scholar from Nigeria, MSc, Transforming and Leading in Health Care, Birmingham City University)

Michael Ofori reached the final stage of a global Sustainable Development Goal (SDG) competition hosted by Durham University. Working with students from other universities, they produced a story board which was turned into animation on 'Chocolate: bean to bar – How your consumption habits can help the environment', addressing SDGs 12, 13, and 15. (Shared Scholar from Ghana, MSc, Sustainability, Culture and Development, Durham University)

Obituaries

Raymond Buhr was a pioneer in software engineering, spreading his ideas in industry through projects and courses, as well as in international standards. He invented SmallTalk, one of the first Object Oriented computer languages. He was Professor Emeritus at the Department of Systems and Computer Engineering at Carleton University until his retirement in 1999. (Scholar from Canada, PhD, Electrical Engineering, University of Buckingham)

1965

Joseph Theophilus Christopher was

a Commissioner of Education and educational historian who documented segregation in Bermuda's schools. He was also a teacher, principal, chief education officer and President of the Bermuda Union of Teachers. (Scholar from Bermuda, PhD Solid State Physics, Durham University)

Alumni events

Commonwealth Alumni share impact stories at Interchange 21

On 8 and 9 March 2021, the British Council hosted Interchange 21, a new online engagement event for Commonwealth Scholars and Alumni, organised on behalf of the Commonwealth Scholarship Commission in the UK (CSC).

Featuring presentations from over 30 alumni across a range of development issues, from Girls' Education to food security, cyber awareness, and climate resilience, the event brought together a wealth of expertise with over 500 Scholars and alumni attending over the two days, and 420 joining for the welcome and keynote speeches on 8 March.

The event marked two significant dates in the Commonwealth Scholarship calendar, Commonwealth Day and International Women's Day, and showcased the unity of purpose amongst Scholars and alumni in delivering sustainable development impact and improving the lives of vulnerable communities through education, research, and knowledge sharing.

Key speakers of the event included Richard Middleton, Chair of the CSC, and Alicia Herbert OBE, Director for Education, Gender and Equality, and Gender Envoy at the Foreign Commonwealth and Development Office (FCDO). Drawing attention to the damaging impact of the COVID-19 pandemic on girls' access to education, Richard Middleton highlighted the CSC's priority in 2021 to support girls' education as "the greatest investment to a sustainable and happy future" for all. Alicia Herbert discussed the FCDO's Strategy on Gender and Girls' Education, during which many attendees shared comments and experiences from their own work and studies, as well as expressing shock at some of the barriers still facing girls today.

As part of the opportunity, all presenters were offered presentation skills training by an experienced media and science communicator as well as being supported to produce a short summary video which was shown at the beginning of each presentation session. This meant that presenters could clearly demonstrate the significance of their work and build connections with attendees across different disciplines.

Interchange 21 closed on 9 March with Andrew Chadwick from the British Council leading the congratulations to all those who had contributed to the success of the event.

To find out more about Interchange 21, please visit the News section of the CSC website.

Ackim Banda

2nd and final day of the @commschols first virtual Alumni Global Conference concluded. Sana Rasool speaking on Clean Green Pakistan, an innovative approach to sustainability. Lovely moderating some sessions of #Interchange21 @BritishCouncil @HEGoingGlobal



4:57 PM - Mar 9, 2021 - Iwitter for Android

4 Retweets 16 Likes



Honoured to be one of the 38 presenters #Interchange21 by @commschols & @BritishCouncil sharing set-up of #COVID19 hospital and research on #Hydroxychlroquine, also estimating #healthcareworker infection. Thanks to RoselineObadino (moderator) & AzizulAzizan (photo)



4:05 PM - Mar 9, 2021 from Mukim 11, Pulau Pinang - Twitter for Android

1 Retweet 1 Quote Tweet 10 Likes

Cl You Retweeted Afolabi Mutiat @Lady_Mutiat

#IWD2021 keeps getting better with the #Interchange21 event organised by @commschols. Getting to network and attend the lecture on improving girls'education and the diverse events on promoting global prosperity has been a great experience. Can't wait forDay2

CSC in the UK @commsch

We are live at interchange 211 it's great to welcome Alumni, Scholars and partners from across the #Commonwealth to the first virtual Commonwealth Scholarships programme-wide Alumni conference hosted by @BithshCourol. #CommonwealthDay2021 #IWD #Interchange21 @HEGoingGlobal



2:09 PM - Mar 8, 2021 from Nottingham, England - Twitter for Andre

Caribbean

The first online regional event for Commonwealth Alumni based in the Caribbean, 'Connect and Communicate', was held in February 2021. The event brought together alumni across the Caribbean and included presentations from three alumni on their work and its development impact in Jamaica, Belize, and Guyana.

Malawi

Alumni in senior leadership positions in Malawi took part in a panel discussion titled, 'Leading Change and Impact During Covid-19', in February 2021. During the session, the presenters shared how they have led change during Covid-19 across key sectors, including healthcare, agriculture, and education.

Nigeria

A welcome home event was held in Nigeria in February 2021 to bring together recently returned Scholars to share their UK experiences and connect with alumni. As part of the event, two alumni delivered presentations on career building and development and introduced recently returned Scholars to the local alumni association, C<u>OSFAN.</u>

South Africa

Newly returned Scholars in South Africa attended a welcome home workshop in February 2021. The workshop aimed at formally welcoming home the newly returned Scholars and provided a platform to network, while exploring their ideas and plans about how to effect change in their home country The workshop involved a planning session on ways to positively contribute to the socioeconomic development of South Africa.

Alumni in South Africa took part in an advocacy workshop in February 2021. The workshop sought to explore the role Commonwealth Alumni can play in promoting Commonwealth Scholarships in South Africa and challenged attendees to identify ways of connecting both as an in-country alumni network and as a network of CSC ambassadors.

CSC's Knowledge Hub webinar series

The Knowledge Hub webinar series was launched in July 2020 for members of the CSC's Knowledge Hubs. The webinars provide a platform for Commonwealth Scholars and Alumni to discuss their work and contribution to development across a range of contemporary global challenges and provide insight into ongoing research and action. The webinar series addresses the six CSC development themes aligned with the Knowledge Hubs.

February 2021

Opportunities for Artificial Intelligence Research in Africa: PapsAl Use case in Uganda

CSC theme: Science and technology for development

The webinar, 'Opportunities for Artificial Intelligence Research in Africa: PapsAI Use case in Uganda', was delivered by Wasswa William, 2018 Commonwealth Split-site Scholar from Uganda, PhD Biomedical Engineering, University of Strathclyde and Mbarara University of Science and Technology, Uganda.

Wasswa presented on his PhD research on the application of artificial intelligence (AI) for cervical cancer diagnosis using pap-smears and shared some of the opportunities and challenges of AI research in A<u>frica.</u>

March 2021

Smallpox Eradication: Revisiting the Indian success story

CSC theme: Strengthening health systems and capacity

The webinar, 'Smallpox Eradication: Revisiting the Indian success story', was delivered by Namrata Ganneri, 2017 Commonwealth Rutherford Fellow from India, Post Doc. History of Medicine and Health Policy, University of York.

Namrata provided insights into the challenges faced and eventually overcome in formulating and implementing one of the world's most extensive vaccination campaigns, and concluded with reflections on the lessons offered by this public health success story to tackle current global health challenges.

You can watch previous webinars on the CSC YouTube channel. To attend the live webinars, you must be a member of a CSC Knowledge Hub. See the 'Get Involved' section on page 31 for details of how to join our CSC Knowledge Hubs.

Scholar events

Since mid-March 2020, Scholars have been invited to take part in virtual events, workshops, and activities designed to provide additional networking and training opportunities.

Despite the limitations of the last year due to the Covid-19 pandemic, we are pleased to see the Scholar community participate enthusiastically in a range of virtual activities - a small selection of which are pictured here.





Free Resources

4

Scholars sharing their research with Welcome meeting attendees over Zoom

B

PhD Scholars from the London Region meet with an alumnus

<u>C</u>

A screenshot of Dr Dominique's presentation on mental health and wellbeing

D

A screenshot of a presentation and attendees at a 'Beating burnout & staying positive' session led by the company Haptivate



С

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shout

Get involved

You can stay part of the CSC community through events across the Commonwealth, promoting our Scholarships and Fellowships to potential applicants, and joining our alumni associations and other networks.

Regional Networks

Our Regional Network Coordinators for the 2020-21 academic year have been busy organising virtual regional events and activities, and bringing Scholars together to collaborate and exchange ideas in an informal and supportive environment.

Some of the events that have already taken place this academic year have included meet and greets, tea sessions, and casual get-togethers where Commonwealth Alumni have also participated and provided some of the current Scholars with valuable advice on how to manage their academic programme during this pandemic.

We invite you to connect with Commonwealth Scholars in the same university or region within the UK:

Scotland

North West England North East England Wales and Northern Ireland Midlands and Oxford South West South East

For full details, visit https://cscuk.fcdo.gov.uk/networks/ regional-networks

Knowledge Hubs

The CSC's Knowledge Hubs provide a platform for Commonwealth Scholars and Alumni studying and working in similar disciplines to network and exchange ideas to support a shared sustainable development outcome under the CSC's six themes.

As a member of a Knowledge Hub, you can post news about your current work and research, share links to reading and publications, and ask and answer questions related to your work.

The six Knowledge Hubs are:

Science and technology for development Strengthening health systems and capacity Promoting global prosperity Strengthening global peace, security and governance Strengthening resilience and response to crises Access, inclusion and opportunity

For full details about the Hubs and to join, visit **https://** cscuk.fcdo.gov.uk/networks/knowledge-hubs

Alumni Associations

Meet and network with past, present, and future Commonwealth Scholars and Fellows



Africa

- Cameroon Nig Ghana Rwa Kenya Sier Lesotho Tan Malawi Uga Mauritius Zan Namibia
- Nigeria Rwanda Sierra Leone Tanzania Uganda Zambia

Caribbean

- Barbados Dominica Guyana Jamaica
- St Lucia Trinidad and Tobago

Europe

Gibraltar

N. America

Canada



South Asia

Bangladesh India Malaysia Pakistan Sri Lanka

For full details, visit **https://cscuk.fcdo.gov.uk/alumni/** associations

For further details about these activities and more, visit www.cscuk.fcdo.gov.uk







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