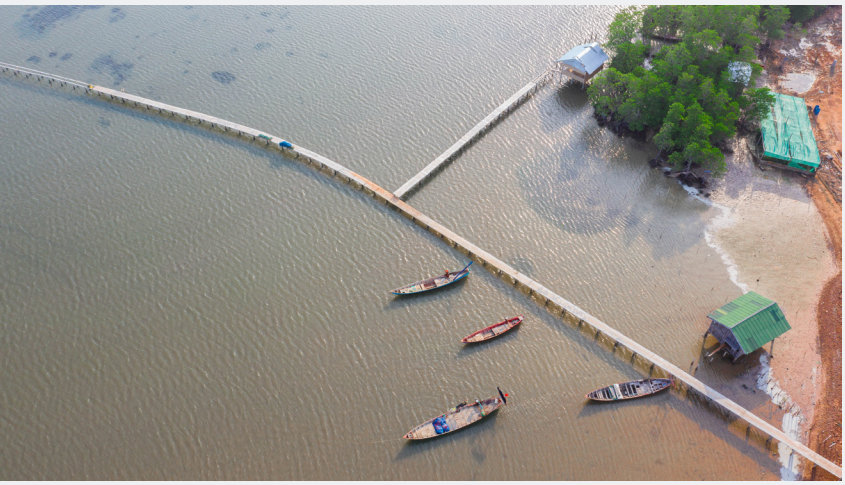
UKCDR

UK Collaborative on Development Research



SUPPORTING THE COP26 PRIORITIES THROUGH RESEARCH ON INTERNATIONAL DEVELOPMENT & CLIMATE CHANGE

UK-FUNDED RESEARCH PROJECT SHOWCASE

About UKCDR

UK Collaborative on Development Research (UKCDR) is a collaborative of government and research funders working in international development, governed by the Strategic Coherence for ODA-funded Research (SCOR) Board. Our core contributing members include the Department for Business, Energy and Industrial Strategy (BEIS); the Department for International Development (DFID); the Department of Health and Social Care (DHSC); UK Research and Innovation (UKRI); and Wellcome. UKCDR exists to amplify the value and impact of research for global development by promoting coherence, collaboration and joint action among UK research funders.

For further information on UKCDR, please visit ukcdr.org.uk.

Front cover images: UNDP Climate - 1) Aerial view of mangroves; 2) Bringing clearn energy to rural India; 3) Community Mangrove Planting; 4) Flooding in Bangladesh

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Foreword

Research on climate change and international development has a crucial role to play in supporting the COP26 priorities, and achieving the terms of the Paris Agreement and UN Sustainable Development Goals. The COP26 priorities of Adaptation & Resilience, Nature, Energy Transition, Clean Road Transport and Finance have both unique challenges and opportunities in the context of low and middle-income countries. The World Bank calculates that without climate-informed development 100 million additional people could be forced into poverty by 2030. Poor and marginalised populations, Small Island Developing States (SIDS) and Low-Income Countries (LICs) are among most vulnerable to the impacts of climate change. Moreover, without innovation, developing countries are increasingly likely to contribute to climate change as they experience population increase, urbanisation and economic growth.

Research is therefore critically important for identifying how to achieve the conditions under which climate goals can be achieved alongside development goals, and to design strategies to maximise the synergies and minimise the trade-offs between the two. Research on climate change and international development is already doing much to achieve real-world impacts, ranging from shaping policy and practice and building knowledge to generating new engagement, relationships and capacity strengthening.

The examples that follow in this booklet show just some of the outstanding contributions which research is making to delivering impacts in the context of the COP26 priorities.

In November 2021, the UK will host the Conference of the Parties (COP26) to the UNFCCC, and countries around the world report on their revised nationally determined contributions of greenhouse gas emissions for the first time since the Paris Agreement in 2015. With current contributions unlikely to be ambitious enough to keep temperature rise within the terms of the Paris Agreement, the UNFCCC has emphasised the central role of research in tackling climate change, calling for countries to make bolder science-based commitments at COP26.

UKCDR recognises the value of the international development research community in contributing to effective, knowledge-based and timely action on climate mitigation, adaptation and resilience and climate science, and hopes that this booklet will lead to further conversations over the coming year about how this sector can support global climate goals, and the COP26 priorities in particular.

This booklet has been produced as part of the UK Collaborative on Development Research (UKCDR) webinar, Supporting the COP26 priorities through research on international development and climate change, which took place in November 2020. The webinar aimed to showcase impacts resulting from UK-funded research, to provide learning around research to achieve the COP26 priorities, and to provide opportunities for networking among the climate change and international development research community during the COVID-19 pandemic. A recording of the event, as well as a web-based version of this booklet, are available on the UKCDR website. In addition, UKCDR have a project to map and analyse the scope and reach of UK ODA and Wellcome-funded research on climate change and international development. The findings from this project will publish in early 2021.

Marta Tufet, Executive Director, UKCDR

Youth call out UN, world leaders on climate action.

UK-FUNDED RESEARCH PROJECT SHOWCASE

Access to Land: Implications of Customary and Private Land Rights for Food Security

Lead institution: University of Hertfordshire

Delivery partners: Periyar University, Salem, India

Thematic focus: Food Security, Land and Forest Rights

Country/countries of focus: India

COP26 priority/priorities: Adaptation and Resilience 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.'

Funder(s): UK India Educational and Research Initiative (UKIERI) and University Grants Commission, India, and Internal funding from 'Feed the World' Campaign

Funding amount: £299, 215 (£164,440 + £134,775)

About the project

A three-year project, funded by UKIERI-UGC and the University of Hertfordshire's research Campaign 'Feed the World', a cross disciplinary team from Hertfordshire and Periyar University in Salem, India undertook socio-legal research into structural issues affecting farming and food security.

One part of the project investigated land fragmentation, policies and practices to mitigate the impact of such fragmentation, and led to the conclusion that climate change impact was the biggest factor affecting farming alongside land fragmentation. Farmers came together through collective farming, nudged by a government programme, to form Farmer producer organisations (FPOs), and their collective activities have all been aimed at adaptation to prolonged drought in the region. The structural issue that has limited the growth of FPOs is the lack of coordination between local agencies and the rural agricultural bank NABARD on data and common goals for supporting FPOs. The project proposes solutions and pathways to address this gap.

How the project is supporting the COP26 priorities

The above research falls within COP26 priority, Adaptation and resilience, 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.' The project enables new thinking on governance for sustaining FPOs, which are grassroot solutions for developing individual as well as institutional resilience in the face of impact of climate change in the region. It is necessary to develop flexible and responsive mechanisms of governance for adaptability in changing contexts. Collective organic agriculture is a way of coping with the impacts of the changing climate, carry

IMAGE: The UH Team at the Salem Tahsildar's Office, 2017

on with healthy sustainable living, and maintaining farming traditions in this region, and supporting its growth enables the local economy to diversify sustainably, helping the farmers and consumers of the region, while fostering crop diversity and reaping other environmental benefits. COP26 priority on adaptation and resilience is of much relevance to this part of the project.

Impact

The project has initiated outward facing collaborative social science research at a rural university, setting new standards for research at the University. The University is a widening participation institution, which serves deprived communities of the region. This research was designed to be conducted in a rural area involving research students who hail from that area, this has caused a group of young researchers to engage with their local community on local issues of global significance. This is a model that can be replicated over the years to come, with benefits for the local university, as well as the local administration who will be supporting both rural education, as well as obtaining research data. The research has adopted action research methodology by involving local officials right from the commencement of the project. Our last phase of impact activities is severely affected because of the pandemic and the consequent restrictions in research activities.

University of Hertfordshire UH

PERIYAR UNIVERSITY SALEM Wisdom Maketh the World

The Advanced Fuel Cycle Programme (AFCP)

Lead institution: The National Nuclear Laboratory (NNL)

Delivery partners: Over 100 organisations spanning academia, industry, national laboratories and Government

Thematic focus: Clean energy innovation

Country/countries of focus: United Kingdom

COP26 priority/priorities: Energy transition, adaption and resilience, nature

Funder(s): Department for Business, Energy and Industrial Strategy (BEIS)

Funding amount: £46m (part of the BEIS £505m Energy Innovation Programme)

About the project

The nuclear fuel cycle is a crucial enabler of Net Zero, empowering sustainable solutions for a clean energy ecosystem. As part of the UK's climate change solution, the Department for Business, Energy and Industrial Strategy's £505 million Energy Innovation Programme has provided significant investment for nuclear innovation through the Advanced Fuel Cycle Programme (AFCP).

Led by the National Nuclear Laboratory (NNL) and uniting more than 90 UK organisations, AFCP is positioning the nation to confidently deliver the fuel cycle of the future. In mobilising the national supply chain while strengthening international engagement, AFCP is elevating UK nuclear capacity and empowering industry to underpin Britain's transition to a low carbon landscape.

AFCP is developing UK-made, globally deployed, next-generation nuclear fuels alongside routes for the recycle of these valuable resources. Together, AFCP is taking a holistic approach to collaboration, innovation and fuel cycle science to pioneer a sustainable future.

How the project is supporting the COP26 priorities

AFCP is accelerating the UK's clean energy transition while drawing intersections across COP26 priorities. Developed to drive world-leading fuel cycle innovation, AFCP is ensuring that affordable, reliable, environmentally conscious and resource-efficient nuclear technologies play a key role in achieving and sustaining global clean energy ambition.

Expansion of renewables and nuclear is required to meet Net Zero, AFCP is investing in the generation and deployment of flexible fuel types to fuel this nuclear demand. From improving the economic performance of current reactor fuels to developing revolutionary fuels for advanced reactors, AFCP is at the forefront of energy technology that is adaptive and resilient.

Additionally, the programme's holistic fuel cycle approach places nature at the centre of recycling innovation; AFCP is evolving reuse and recycle of precious resources. This sustainable safeguarding reduces the need for mining new materials while reimagining the potential of used fuels for future reactors, batteries and nuclear medicine.

Impact

With defined strategic outcomes, AFCP is delivering impact across science and society to underpin the UK's Net Zero landscape.

The programme is engaging with global partners to collectively address climate change. Recently, AFCP was instrumental in launching the UK's first IAEA Collaborating Centre, recognising the nation's advanced fuel cycle leadership while enabling future international innovation.

AFCP is driving notable economic benefits both near- and far-term. The programme is actively positioning organisations to access clean energy markets, enhancing export potential, creating green jobs and targeting solutions to drive down the cost of clean energy.

With a focus on people and skills, AFCP elevates expertise across its multidisciplinary, multigenerational network to support clean energy commitments. Meanwhile, AFCP is constructing ten new essential research and manufacture capabilities to expand UK infrastructure.

Through piloting national and international collaboration at scale, AFCP demonstrates how investment in innovation is an essential catalyst for Fuelling Net Zero.

AFCP
Advanced Fuel Cycle Programme

BRAVE: Building understanding of climate variability into planning of groundwater supplies from low storage aquifers in Africa

Lead institution: Walker Institute

Delivery partners: British Geological Survey, Lorna Young Foundation, Water Research Institute (CSIR) Ghana, Ouagadougou University Burkina Faso

Thematic focus: Water, Climate Change, Groundwater, Water security, Development, Adaptation, Resilience

Country/countries of focus: Burkina Faso, Ghana

COP26 priority/priorities: Adaptation and Resilience; Nature

Funder(s): UPGro, the UK's Department for International Development, Natural Environment Research Council and Economic and Social Research Council

Funding amount: £1.2m

About the project

The BRAVE project aims to reduce risk and improve water security resilience of rural communities in the Sahel region of Africa by combining better understanding and planning of groundwater supplies with practical communication and knowledge exchange at all levels, from individual smallholder farmers to national government and regional bodies.

The BRAVE project takes an interdisciplinary approach to integrate information on livelihoods and vulnerability with physical modelling of land surface and groundwater. Our improved understanding of how water moves through catchments in the Sahel and the resilience of supplies to climate variability and change, combined with information on vulnerability of different groups in the community, has enabled the project to create contextually applicable planning and monitoring tools. These tools support sustainable investment in groundwater and unlock the potential of this valuable water source.

The BRAVE project is part of the UPGro consortium who produced a film communicating the consortium's findings: http://www.walker.ac.uk/about-walker/news-events/upgro-film-unlocking-africas-groundwater-potential/

How the project is supporting the COP26 priorities

In the Sahel region, rainfall is projected to become increasingly erratic with climate change. Alternative, more reliable water sources are required to support poverty reduction and rural development. The region contains large volumes of water underground, in groundwater aquifers, which may be enhanced by more intense rainfall events. The BRAVE project aims to develop tools to support evidence-based, sustainable and contextually relevant management of this groundwater resource, and communicate these with stakeholders at all levels, from small holder farming communities, to district planning officers and national policy makers. This will be vital for supporting adaptation and resilience to climate impacts in the region. This is directly relevant to the first COP26 priority stated by Alok Sharma MP in his speech to UN member states on 8 March 2020: "First, adaptation and resilience. Helping people, economies and the environment adapt and prepare for the impacts of climate change."

Impact

The BRAVE project has supported increased evidence-based decision making on groundwater resource use and planning at multiple levels. Strong relationships with stakeholders in national government and the Coalition of NGOs in Water and Sanitation (CONIWAS) has been critical to these impacts.

At the transboundary level, BRAVE findings on groundwater, poverty and water resource access were used to inform the White Volta Basin Authority's Integrated Water Resource Management plans.

At the national level, engagement with CONIWAS in Ghana resulted in a request from parliamentarians to establish an intersectoral committee on groundwater. In Ghana and Burkina Faso, national policy makers attended scenario planning workshops on climate change and groundwater. In Burkina Faso, these scenarios will inform the development of the National Adaptation Plan for the Water Sector.

At the community level, farmer-led radio programmes have provided accessible, relevant information to farmers, supporting ground-level changes that improve their climate resilience.

BRAVE

UPGro Unlocking the Potential of Groundwater for the poor upgro.org

Walker INSTITUTE

Building adaptive capacity to cope with effects of climate change on riparian based ecosystems and livelihoods in semi-arid areas of Zimbabwe

Lead institution: Chinhoyi University of Technology

Delivery partners: Ministry of Environment, Climate, Tourism and Hospitality Industry (Climate Change Management Department); Chiredzi Rural District Council; Mwenezi Rural District Council; Gonarezhou Conservation Trust; CIRAD Zimbabwe (RP-PCP Platform); AGRITEX; ZINWA

Thematic focus: Climate Change Impacts, Nature, Adaptation and Resilience

Country/countries of focus: Zimbabwe

COP26 priority/priorities:

- Adaptation and resilience: 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.
- Nature: 'Safeguarding ecosystems, protecting natural habitats and keeping carbon out of the atmosphere"

Funder(s): Department for International development (DFID) (now Foreign Commonwealth & Development Office (FCDO))

Funding amount: USD100 000

About the project

This transdisciplinary study aimed to explore the impact of climate change on riparian based ecosystems and livelihoods dependent on two perennial river systems (Mwenezi and Runde River), in the south eastern Lowveld, Zimbabwe. Participatory approaches were used to collect data using smart-mobile phones; focus group discussions, key informant interviews and field observations. The project addressed the following thematic areas: climate change impacts on river based ecosystem goods and services, river based coping and adaptation strategies and implications on the conservation of biodiversity and in riverine ecosystems. The study was conducted in collaboration with local communities, rural district councils, selected government departments, civic organizations and other local NGOS. Findings from the study will contribute towards building resilience for river based livelihoods and also packaging of possible interventions to manage and restore riparian ecosystems as safety nets and carbon sinks in the face of climate change.

How the project is supporting the COP26 priorities

Projections show that by 2025 approximately 480 million people in Africa could be living in water stressed areas. Riparian ecosystems generally act as safety nets for those areas where surface water is scarce. The research focused on building adaptive capacity to cope with effects of climate change on riparian based ecosystems and livelihoods in semi-arid savannah setting. Changes in the flow regime of rivers (due to anthropogenic or natural factors) results in damage to riparian ecosystems thereby compromising the goods and service delivery by these systems. It emphasizes on documenting and promoting positive riparian based coping and adaptation strategies thereby building community resilience. The project helps people and the environment to adapt and prepare for the impacts of climate change on riparian zones which are already threatened by multiple anthropogenic stressors. The project also aimed at raising awareness on the need to safeguarding riparian forests as natural sinks thereby keeping carbon out of the atmosphere.

Impact

The fellow has managed to create new networks and has been identified as one of the participants under the forestry and biodiversity cluster for development of the National Adaptation Plan and the Climate Change Learning strategy led by the Climate Change Management Department.

The project has contributed towards capacity building of postgraduate university students and local natural resources conservation practitioners through virtual and physical training workshops. Two postgraduate studies successfully completed their MSc Biodiversity Conservation research projects which were based on part of the project components.

The project hopes to influence climate policy at local and national level and also contribute towards achieving SDG 13 (Climate Action) in Zimbabwe. The project also fulfils part of the Agenda 2063, UNCBD AICHI TARGETS, CBD Strategic Plans, IPBES on the need to integrate local ecological knowledge on ecosystem goods and services for sustainable biodiversity conservation.

CHAMNHA: Climate, heat and maternal and neonatal health in Africa

Lead institution: London School of Hygiene & Tropical Medicine

Delivery partners: Aga Khan University, Kenya; Institut de Recherche en Sciences de la Sante (IRSS), Burkina Faso, WITS RHI, South Africa, South African Medical Research Council, South Africa; University of Leeds, UK; Karolinska Institutet, Sweden; University of Oslo, Norway; University of Washington, USA.

Thematic focus: Climate change and health systems resilience, climate services for health

Country/countries of focus: Kenya, Burkina Faso

COP26 priority/priorities: Adaptation and Resilience. 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.'

Funder(s): NERC/UKRI, Research Council of Norway (RCN), Forte (Sweden), NSF and NOAA (USA); coordinated through the Belmont Forum.

Funding amount: UK funding (NERC) = £689,400. Total consortium funding = £1,718,000.

About the project

CHAMNHA is a three-year research project funded by the Belmont Forum, led by an inter-disciplinary research team. Heatwaves are expected to increase in intensity in the coming years due to climate change. Heat exposures complicate maternal and neonatal health but few studies have assessed these impacts in sub-Saharan Africa, where maternal and new-born deaths are frequent, facilities can experience high indoor temperatures, health systems have low adaptive capacity and access to services is increasingly disrupted by climate events. Our research will investigate whether high temperatures have adverse effects on maternal health (including preterm birth), on health services, and on babies. We will develop low cost measures to reduce the risks of heat at home and in hospital facilities. This will involve interviewing mothers and health workers about their understanding of heat risks and what would work best to prevent future impacts as heatwaves increase.

CHAMNHA
CLIMATE, HEAT AND MATERNAL AND NEONATAL HEALTH IN AFRICA

How the project is supporting the COP26 priorities

Research by CHAMNHA addresses the COP26 priority of Adaptation and Resilience by providing evidence of heat impacts that is targeted to national and regional decision makers. Most countries have relatively well-developed climate adaptation plans but pregnant women have only recently been identified as a vulnerable group. The health sector lags substantially behind other sectors in terms of adaptation planning.

CHAMNHA will work with local communities and health decision makers to help prepare for the health impacts of climate change on mothers and newborns in high-risk areas, and will work to increase the resilience of healthcare systems to extreme heat events, as well as providing evidence on health risks for national adaptation planning.

Impact

Our research will provide evidence for the health sector in sub-Saharan Africa to increase climate resilience. Strengthening maternal and neonatal health services are a major objective of the Sustainable Development Goals, but climate change may undermine efforts to achieve these goals. We are working with local communities in Burkina Faso and Kenya to develop low cost interventions to address heat risks. Evidence-based interventions will lead to social and economic benefits for women, children, their families and their communities through improved health and reduced household expenditure on medical care and lost income. If specific interventions we test in this study are found to be effective and feasible to implement, the translation of these findings into concrete policy and practice changes will also contribute to improving health and wellbeing in other population groups and in other countries.

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Centre on Climate Change & Planetary Health

Climate Change Policies for People: Implementing Co-Developed Water Governance and Security in the Upper Atoyac River Basin, Puebla

Lead institution: University of Edinburgh

Delivery partners: Universidad Iberoamericana Puebla

Thematic focus: Collaborative Climate Change Adaptation and Monitoring

Country/countries of focus: Mexico

COP26 priority/priorities: Adaptation and Resilience

Funder(s): Newton Fund / British Council / REDNACECyT

Funding amount: £ 199,581

About the project

This project is the continuation of the Newton Fund/British Council project "Developing collaborative smart city solutions to manage adaptation and monitoring climate change related risks in Mexico". This project was based on dialogues with members of different communities in San Andrés Cholula, Mexico, to identify climate-change related challenges and possible adaptation strategies. The main findings of these project were: people are willing to co-create adaptation strategies but consider they require access to information to make more informed decisions; and most of their concerns are connected to water. Findings of this project showed the importance of community knowledge and monitoring capacity to increase water governance measures in drought-prone areas, by understanding the diverse effects of climate change co-developing mitigation and adaptation strategies with local communities. The current aim is to deliver impact by conducting a broader range of stakeholder consultations to co-develop, test, and implement policies for improved water security.

How the project is supporting the COP26 priorities

The spirit of the project is connected to two of the priority action areas for COP26 and 2020:

1. Adaptation and resilience, because we are considering the role of co-developed strategies that will contribute to Climate Change adaptation considering the value of knowledge in local communities, the dialogues between different stakeholders, and co-creating strategies.
2. Nature, the project focuses on water governance and security because it is a fundamental for survival. The relationship between communities and water is not only about protecting natural habitats and safeguarding ecosystems, it is also one of the main reasons for social conflict and climate risk.

IMAGE: Community-led initiative to plant trees in Santa María Tonantzintla

IMAGE: Dialogues of Knowledge in San Andrés Cholula, Puebla

Impact

The impacts of these project are shown in two levels: The main impact of the project was the result of the dialogues with local community members in different localities in San Andrés Cholula, Puebla. For example, a local assembly in Santa María Tonantzintla has engaged in community-led projects to recover old water channels and ditches, plant trees and transform their own houses to contribute to rainwater capture. The dialogues with the communities also contributed to policy because some of the participants in the workshops have introduced some of these climate adaptation strategies during the consultation process for the local urban development plan and the environmental management plan. The current plan is built over these possibilities aiming to impact in a larger scale, considering the Atoyac river basin and its regional importance.

For further information about the projects:

https://www.globalurbancollaborative.org/collaborative-smart-city-solutions

https://www.globalurbancollaborative.org/climate-change-policies-for-people

THE UNIVERSITY of EDINBURGH

IBERO PUEBLA ®

Development of coastal Bangladesh under climate change scenarios

Lead institution: University of Southampton

Delivery partners: Bangladesh University of Engineering and Technology (BUET)

Thematic focus: The future of ecosystem services, especially food provision (Agriculture, aquaculture, capture fisheries) and wider livelihoods

Country/countries of focus: Bangladesh

COP26 priority/priorities: Adaptation and Resilience 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.'

Funder(s): NERC/ESRC/DfID Ecosystem Services for Poverty Alleviation (ESPA) Programme (via the ESPA Deltas Project)

Funding amount: £3.7 million

About the project

Mid and low latitude deltas worldwide support about 500 million people. Delta residents are often poor and depend on subsistence rural livelihoods linked to ecosystem services. A good example is Bangladesh where rural population density can exceed 1,000 people/km2. Livelihoods are vulnerable to climate and environmental change and variability, as well as economic and social change. To understand these issues we examined a range of biophysical and socio-economic processes in Bangladesh (e.g., agriculture, fisheries, mangroves) using the best available models and a household survey to understand how people utilise ecosystem services. The research was strongly participatory with a series of stakeholder workshops conducted in collaboration with the General Economic Division of the Planning Commission of the Government of Bangladesh. At the heart of the analysis is the innovative Delta Dynamic Integrated Emulator Model which brings all these elements together in form allowing analysis of different development trajectories including policy choices.

How the project is supporting the COP26 priorities

Deltas are considered some of the most vulnerable areas in the world to climate change and Bangladesh is regularly considered one of the most vulnerable countries. This research helps to understand those vulnerabilities in more detail and what can be done about it in terms of adaptation and resilience, and how this links to development. Our results show that climate and environmental change interacts in complex ways with land and water management, livelihoods, market conditions and population dynamics and this produce diverse and often negative socio-ecological outcomes and trade-offs. However, there are plausible adaptation and development interventions that can significantly mitigate these risks, reducing poverty, raising aggregate well-being and enhancing adaptive capacity. Therefore, despite the threat of climate change there is significant potential to address current socio-environmental vulnerability in coastal Bangladesh and develop a more resilient future.

June 2014, Rajendrapur, Dhaka, Bangladesh

IMAGE: The ESPA Deltas team at one of our meeting, Bangladesh 2014

Impact

This research engaged with our Bangladesh partners – led by the Institute for Water Management at the Bangladesh University for Engineering and Technology. It also engaged with the General Economic Division (GED) of the Planning Commission of the Government of Bangladesh, who are developing and applying the Bangladesh Delta Plan 2100 which is planning national development that is resilient in the face of climate change. This strengthened the participatory dimensions of our research. The methods have been applied to assess questions posed by GED such as the effects of water logging and the likely outcome of selected projects within the Bangladesh Delta Plan 2100, in particular the South Central Polders which were found to have important benefits on balance. The results are described here https://iwfm.buet.ac.bd/site/home_slide/integrated-assessment-for-the-bangladesh-delta-plan-2100-analysis-of-selected-interventions/. There is strong interest in GED in taking these methods forward in further application.

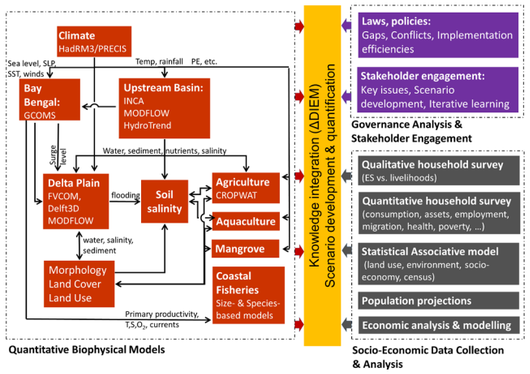


IMAGE: The components pf the ESPA Deltas Project Bangladesh 2014

Food System Adaptations in Changing Environments in Africa (FACE-Africa)

Lead institution: London School of Hygiene & Tropical Medicine, UK

Delivery partners: MRC Unit The Gambia at LSHTM, The Gambia; International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Research Program, West and Central Africa, Mali; MRC Cambridge, UK; and International Institute for Applied Systems Analysis (IIASA), Austria

Thematic focus: Food Systems, Climate Adaptation and mitigation

Country/countries of focus: The Gambia and West Africa

COP26 priority/priorities: Adaptation and Resilience 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.'

Funder(s): Wellcome, UK, under the Our Planet, Our Health Programme (grant number 216021/Z/19/Z)

About the project

FACE-Africa is a two-year Wellcome funded project currently implemented in The Gambia as a case study for other West African countries. Climate change is profoundly affecting the ability of West African countries to provide sufficient healthy food for their populations. Droughts, unpredictable rainfall patterns and increased heat are affecting crop yields and quality. In addition, rapid population growth, changing diets and urbanisation are increasing and transforming the demand for food. Without appropriate action, problems of food insecurity and associated poor health will be unavoidable. To address this problem, policy makers require country-specific information on effective strategies to adapt to climate change, and ensure sufficient production, import, manufacture and delivery of food for their populations.

FACE-Africa uses existing data sources to generate evidence to inform climate change adaptation strategies in the Gambian food system - working closely with government policymakers and food system stakeholders, including farmers, retailers and consumers.

How the project is supporting the COP26 priorities

The above research falls within COP26 priority, Adaptation and resilience, 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.' The project uses country specific data and local food system stakeholders to identify locally relevant climate change adaptation and mitigation strategies that will be beneficial for population health and can be practised and scaled-up in a sustainable way. It enables the identification of inefficiencies within the food system such as better performing and climate adaptable crops that are currently underutilized and supporting their uptake. These will help the government and local farmers to optimize crop productivity and ensure food security in a manner that is co-beneficial to farmers and the environment. The COP26 priority on adaptation and resilience is a relevant component of the FACE-Africa project.

Impact

This project is still in its early stages and so the major outcomes are yet to be realised. The following are early outcomes:

- Participation of school children in the discussion of climate change, adaptation and mitigation
- Engagement of local institutions in The Gambia (NARI, UTG, NaNA) and potential capacity in using data to inform decisions
- Increased capacity for interdisciplinary research on food systems, climate and health in West Africa, including at MRC Gambia and ICRISAT in Mali
- Anticipated final outcomes of the project in the next 12 months are as follows:
- A vision of a Gambian food system in 2050 that can provide healthy and sustainable food equitably
- Awareness among Gambian decision-makers of the most appropriate climate adaptations in the food system for population health
- A toolkit of methods to identify climate adaptations in food systems for use in other African countries

IMAGE: The FACE-Africa team at a local Gambian poultry farm in 21st January, 2020 (during project launch).

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Food System Adaptations in Changing Environments AFRICA

FutureDams: the role of dams in Ghana delivering on its nationally determined contributions and Paris commitments

Lead institution: University of Manchester

Delivery partners: Centre for Ecology and Hydrology, University of Cambridge, University College London, Newcastle University, University of Southampton, University of Surrey, University of Ghana, Council for Scientific and Industrial Research, Ghana, International Union for Conservation of Nature, Switzerland, International Water Management Institute, Sri Lanka, Methods for Irrigation and Agriculture, Jordan, Yangon Technological University (YTU), Myanmar

Thematic focus: Carbon emissions and climate change, transition to clean energy

Country/countries of focus: East Africa, Ghana, Myanmar, Jordan and India.

COP26 priority/priorities: Energy transition, Adaptation and resilience and Finance

Funder(s): RCUK as part of the Global Challenges Research Fund.

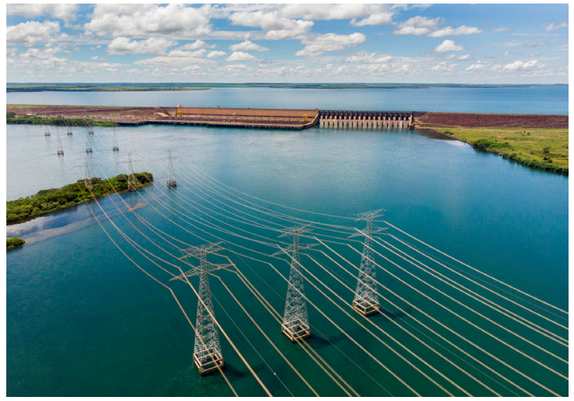
Funding amount: £8 million

About the project

As a renewable energy source hydropower is typically considered to have low emissions. Consequently, many nations include hydropower within their carbon-reduction pledges submitted under the Paris Agreement (i.e. Nationally Determined Contributions – NDCs). However, a growing body of research demonstrates that some hydropower schemes are a significant source of greenhouse gas emissions, particularly when shallow reservoirs are sited in tropical and low-lying regions. In this context, and as part of the FutureDams project, the role of hydropower in Ghana is examined in relation to both the country's NDC and longer-term Paris-compliant emissions pathway. Provisional research suggests that the life-cycle emission intensity of Ghana's hydropower schemes (Akosombo and Bui) exceeds that of gas-fired power stations and approaches that of coal. Understanding this conclusion is key to reconfiguring Ghana's energy system, and particularly the prospects of its planned (Jwalu) and under-construction (Pwalugu) schemes within a Paris-compliant future.

Future DAMS
Design and Assessment of water-energy-food-environment Mega-Systems

How the project is supporting the COP26 priorities



The FutureDams project is developing a sequential framework to assist decision-makers understand the complex implications of their particular choices in relation to national energy systems, emission reductions and irrigation. The project is a partnership between specialist academics and real-world decision-makers in Myanmar and around the Volta and Nile basins. Working with such partners helps ensure the FutureDams knowledge base, tools and approach offer practical guidance to decision-makers addressing issues of resilience and sustainable development in a warming world. As such the project supports COP26 priority action areas on (a) adaptation and resilience, (b) energy transition, and (c) finance.

The specific Ghana case study brings these priority areas into sharp focus. In isolation the construction of yet more large dams is likely to work against a sustainable, resilient and prosperous future. Only if such technologies are evaluated within the demands of wider energy and agricultural systems will progressive decision-making be possible.

Impact

The FutureDams project has established excellent working relationships with organisations and institutions in Ethiopia, Sudan, S.Sudan, Egypt, Jordan, Ghana, Burkina, and Myanmar. With these organisations we are co-developing specific river basin models, as well as facilitating capacity building, to understand and use these models. Several high-level stakeholders and policy/practice decision makers, such as the World Bank, International Hydropower Association, the International Union for the Conservation of Nature and the International Water Management institute, are also involved in the project's development.

The specific work package on hydropower and emissions has attracted considerable interest from Ghana's Council for Scientific and Industrial Research (CSIR), with a route now being developed to ensure the research and provisional findings are showcased to relevant Ghanaian policy makers. With the programme only halfway through its operational stage, there is considerable opportunity to build on existing relationships and to extend the influence of the work to neighbouring nations.

MANCHESTER 1824
The University of Manchester

GCRF African Science for Weather Information and Forecasting Techniques (SWIFT)

Lead institution: National Centre for Atmospheric Science

Delivery partners: University of Leeds (UK); Centre for Ecology and Hydrology (UK), UK Met Office (UK); University of Reading (UK); African Centre of Meteorological Applications for Development (ACMAD) (Niger); IGAD Climate Prediction and Applications Centre (ICPAC) (Kenya); Agence Nationale de l'Aviation Civile et de la Meteorologie (ANACIM) (Senegal); Cheikh Anta Diop University (UCAD) (Senegal); Kenya Meteorological Department (KMD) (Kenya); Ghana Meteorological Agency (GMet) (Ghana): Kwame Nkrumah University of Science and Technology (KNUST) (Ghana); Nigerian Meteorological Agency (NiMet) (Nigeria); Federal University of Technology, Akure (FUTA) (Nigeria); UN World Meteorological Organisation

Thematic focus: Weather forecasting and climate resilience

Country/countries of focus: Senegal, Ghana, Nigeria, Kenya

COP26 priority/priorities: Adaptation and Resilience

Funder(s): Global Challenges Research Fund (GCRF), UK Research and Innovation (UKRI)

Funding amount: £9.2 million

About the project

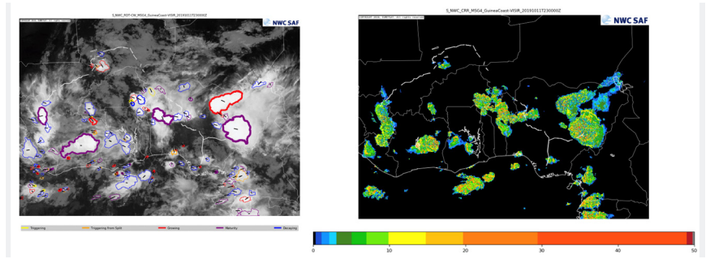
GCRF African SWIFT is delivering new weather forecasting solutions in Africa, and communicating these to climate-sensitive sectors through a process of co-production of services. The project is supporting these forecasting solutions by undertaking fundamental scientific research into the physics of tropical weather systems; evaluation and presentation of complex model and satellite data; and communication and exploitation of forecasts.

In Africa, the impacts of weather are high, due to the severity of weather extremes and to the vulnerability people and economies. Benefits of modern weather forecasting in Africa cannot be realised without the improvements in the skill and capability of the forecasts which SWIFT is advancing.

GCRF African SWIFT works with end-users to tailor the provision and delivery of weather forecasts and to ensure improved response to high-impact events; rapid emergency response to extreme events; and increased resilience, through integration of weather prediction into strategies for response to climate change.

How the project is supporting the COP26 priorities

GCRF African SWIFT addresses "Adaptation and Resilience".



Climate change is being felt in Africa now. Parts of the continent are experiencing the detrimental effects of climate change in the form of an intensified water cycle, with longer dry-spells and more intense storms. Key economic sectors, livelihoods and human lives are frequently affected by droughts or flooding. Strengthening the capacity of national meteorological services to deliver improved forecasts and warnings of severe weather, with stronger relationships between forecasters and end-users, saves lives and livelihoods and protects property and infrastructure.

In Africa, climate change is no longer a theoretical question regarding policy for the future. We need to take action in improving our ability to respond to weather events with immediate effect, and people need to respond to events outside the envelope of their experience. Enabling a society to respond better to heavier precipitation includes improved predictions well suited to the response.

Impact

GCRF African-SWIFT is making a step change in the weather forecasting capability of national and international agencies, on time scales from hours ("nowcasting") to seasons. In particular, we are delivering completely new forecasting tools, through African national weather services, to a range of stakeholders. Forecast communication is being developed through a process of co-production with partners.

This impact is already being felt by our partners through the delivery of meteorological 'testbed' events. The testbeds have made particular advances on the "nowcasting" (0-6 hour) and S2S (subseasonal to seasonal) timescales. The results and documentation from the interaction between forecasts, researchers and end-users is enabling the Standard Operating Procedures of forecasting centres to be updated, and therefore to reshape the delivery of weather forecasts of better quality, relevance, and therefore use.

The results will ultimately be translatable beyond our partners to other regions of Africa and the developing world more widely.

The impact of gender inequality on climate change adaptation and livelihoods of marginalized communities around Mikumi and Ruaha National Parks, Tanzania

Lead institution: Tanzania Wildlife Research Institute

Delivery partners: African Academy of Sciences in Kenya and Nelson Mandela Institute of Science and Technology

Thematic focus: Gender inequality, livelihood, and adaptation strategies for Marginalised communities around protected areas

Country/countries of focus: Tanzania

COP26 priority/priorities: Adaptation strategies for poor communities

Funder(s): Department for International Development (DFID) (now Foreign Commonwealth & Development Office (FCDO))

Funding amount: USD 100,000

About the project

DFID (now FCDO) funds supported my research on the gender and climate change in Tanzania. I have collected some really useful results, and I would like to upscale and use them to create an evidence-based climate change adaptation strategy for communities living adjacent wildlife protected areas in the southern Tanzania, which takes gender and biodiversity into account. My research findings showed that the existing coping and adaptation strategies are gender blind.

In addition, women are doubly affected by the impacts of climate change caused by wild animals because during prolonged drought wildlife migrate from the national parks to the villages and destroy crops and livestock as vegetation and water sources inside the Parks get dry which diminished household assets (see images). Since most crops are rain-fed agricultural system women tend to be at risk to secure family food. Therefore, it is important to design a gender responsive strategy for climate change adaptation.

IMAGES (ABOVE): Food crop and livestock demage by wildlife during prolonged severe drought that make women more vulnerable

How the project is supporting the COP26 priorities

The project is in line with, a number of key strategic decisions on climate change and its policies agreed at different Conferences of Parties (COPs) and meetings which emphasized that vulnerable women and men should be given special consideration in climate change adaptation plans. For example, in the UNFCCC; Decision 1 in CO 16 paragraph 16 and decision 5 in COP 17 provided guiding principles for adaptation action. In addition, the Paris agreement COP 21 (2015) article 7.5, acknowledge that adaptation actions should follow a country's driven gender-responsive participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems by integrating adaption into relevant socioeconomic and environmental policies and actions where appropriate. Therefore, the Conference of the Parties (COP26) needs to explore how adaptation based on human agency could contribute to dealing with climate change.

Impact

The DFID project has generated scientific data to influence decision-makers on the need for gender equality in strengthening climate change adaptative among vulnerable groups and it's the implication to livelihood and biodiversity conservation among marginalized and poor communities around wildlife protected areas in Tanzania. However, our ongoing project has covered only two out of 22 national parks type of protected areas. We are missing information from other types of protected areas including the 23 Game Reserves: 42 Game Controlled Area, Ngorongoro Conservation and 16 Wildlife Management Area. So, we are seeking for additional funding to generate robust data for creating an evidence- based climate change adaptation strategy for Marginalised poor communities living adjacent wildlife protected areas in Tanzania, which takes gender and biodiversity into account.

TAWIRI
Tanzania Wildlife Research Institute

Improved national capacities and governance arrangements for tsunami early warning in Indian Ocean states

Lead institution: University of Huddersfield, UK

Delivery partners: Institute of Technology Bandung, Indonesia; Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS)

Thematic focus: Early warning, governance, disaster risk reduction, tsunami

Country/countries of focus: Indonesia and other countries in the Indian Ocean region

COP26 priority/priorities: Adaptation & Resilience

Funder(s): This work was supported by Institutional Links 2017 grant ID 261824838 and Newton Prize 2019 grant AAM002715, under the Newton Fund Indonesia partnership. The grants were funded by the UK Department for Business, Energy and Industrial Strategy (BEIS) and delivered by the British Council.

Funding amount: £116,820 & £195,630

About the project

The research contributed to a 2018 comprehensive assessment of tsunami preparedness of twenty-one countries that surround the Indian Ocean. It also studied the governance arrangements at the interface between upstream detection and forecasting of the tsunami threat, and downstream warning dissemination and evacuation. This interface involves a wide array of jurisdictional agencies and response partners, including regional tsunami service providers, tsunami national contact points, and a range of sub-national emergency operational centres and related actors. Detailed empirical studies and a comparison of four member states, including Indonesia, the Maldives, Myanmar and Sri Lanka, identified the current status of the four countries against twelve areas of capacity for tsunami early warning, as well as shortcomings in the end-to-end warning chain and standard operating procedures. The research won the Newton Prize for Indonesia in 2019, recognising it as 'best research or innovation that promotes economic development and social welfare'.

How the project is supporting the COP26 priorities

As sea levels rise due to climate change, so do the global hazards and potential devastating damages from threats such as tsunamis. We must help governments, people and economies adapt and become more resilient to these impacts of climate change, a COP26 priority. Despite the progress and improvement at the detection end of the tsunami early warning system that has been developed since the devastating 2004 Indian Ocean tsunami, the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the coordinating body for the Indian Ocean Tsunami Warning and Mitigation System (IOTWMS), has formally recognised that much remains to be done to ensure dissemination of effective warnings and improve the preparedness of communities to respond to such warnings. The devastating Sulawesi and Sunda Strait tsunamis, that both struck Indonesia in 2018, highlight the need to continue building capacity to address tsunami and other coastal hazards, including cascading threats such as landslides and liquefaction.

Impact

In cooperation with ICG/IOTWMS, the research has resulted in changes to regional approaches to assessing tsunami preparedness and priorities for capacity development of member states. It has also resulted in changes to the understanding and awareness of national and subnational actors in tsunami early warning across the region. In Indonesia and Sri Lanka, the research has led to changes in the standard operating procedures that help workers carry out complex routine operations involved in receiving regional dissemination and warning information, evaluating against pre-defined criteria, and disseminating and enacting the response through sub national actors. Dwikorita Karnawati, Chair of UNESCO IOC ICG/Indian Ocean Tsunami Warning and Mitigation System and Director General of National Agency of Meteorology, Climatology and Geophysics, confirmed that, "The research has helped us to carry out a comprehensive assessment of tsunami preparedness in Indonesia and other countries in the Indian Ocean, allowing us to improve our standard operating procedures."

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Intergovernmental Oceanographic Commission

INSTITUT TEKNOLOGI BANDUNG 1920

Intergrating Hydro-Climate Science into Policy Decisions for Climate-Resilient Infrastructure and Livelihoods in East Africa (HyCRISTAL)

Lead institution: University of Leeds, UK

Delivery partners: University of Leeds (UK); African Centre for Technology Studies (pan-Africa); British Geological Survey (UK); CEH: Centre for Ecology and Hydrology (UK); Evidence for Development (UK); IGAD Climate Predictions and Applications Centre (ICPAC), (Kenya); Jomo Kenyatta University (Kenya); Loughborough University (UK); Met Office (UK); National Centre for Atmospheric Science (UK); North Carolina State University (USA); Practical Action (UK); Stony Brook University (USA); Tanzanian Meteorological Agency (Tanzania); Ugandan National Meteorological Authority (Uganda); Ugandan Ministry of Water Resources (Uganda); University of Connecticut (USA); Makerere University (Uganda); Maseno University (Kenya); Walker Institute at the University of Reading (UK); Africa Climate Exchange at the University of Reading (UK)

Thematic focus: East African climate change science, water resources, sanitation and rural livelihoods

Country/countries of focus: Kenya, Uganda, Tanzania, Somalia, Rwanda, Burundi, Ethiopia

COP26 priority/priorities: Climate change Adaptation and Resilience

Funder(s): UKAid and NERC

Funding amount: £4M

About the project

HyCRISTAL addresses two main aims, of improving climate change science for East Africa and use of that in long-term (5 to 40 year) decision making, alongside building capacity for this in East Africa. Its main decision-making pilot studies address Water Sanitation and Hygiene (WASH) in Kampala and Kisumu, and rural livelihoods in the Lake Victoria Basin, with cross-cutting work on water resource modelling. Smaller side projects address tea production (CI4Tea) and Lake Victoria transport systems (HyTpp). HyCRISTAL is engaging wider stakeholder through introducing climate change into the Greater Horn of Africa Climate Outlook Forum (GHACOF), which in the past has only addressed seasonal prediction. HyCRISTAL has developed Climate Risk Narratives for its rural and urban pilots, underpinned by a technical appendix, which are used in its Future-Climate Current-Policy (FCCP) framework.

How the project is supporting the COP26 priorities

IMAGE: Kampala Drainage

East Africa has fast growing populations and economies, both vulnerable to climate change and HyCRISTAL addresses Adaptation and Resilience.

HyCRISTAL climate science addresses user-priorities. We have developed well-evidenced narratives of possible future changes, which have been used in our 'Future Climate Current Policy" framework to engage decision makers in using uncertain information to inform decision making. HyCRISTAL has made a step-change in our scientific understanding, reducing uncertainties that make decision making challenging, in particular: (i) showing that increases in extreme rainfall are expected to be larger and more widespread than those in global models, (ii) that future projections must account for uncertain future aerosol emissions, (iii) narrowing the range of possible future rainfall, (iv) producing new process understanding, including of the "East African climate change paradox", which has limited user-confidence in projections. The climate science has then been used to inform adaptation in the HyCRISTAL pilots (see below).

Impact

HyCRISTAL is working with city authorities and WASH organisations to enable more climate-resilient WASH: with possible interventions including better management of existing drainage and sanitation systems and appropriate design of new infrastructure.

Data generated through research methods such as the Household Economy Approach and the Individual Household Method contribute to a key output on rural livelihoods: the Integrated Database for African Policymakers (IDAPS).

HyCRISTAL is working with the Ministry for Ugandan Water & Environment in Uganda to embed HyCRISTAL research into tools used for catchment-based water resource management and planning.

CI4Tea has worked with varied stakeholders to enable prioritisation of adaptation options.

HyTpp reports are being used by the World Bank to ensure that transport systems around or over Lake Victoria plan appropriately for climate change.

HyCRISTAL's engagement in GHACOF has allowed decision makers to work through expected impacts possible future climate on their sectors and develop action time-lines.

IMAGE: Kampala drainage 2017 (BGS), such drainage can be prone to flooding, with impacts on public health.

HyCRISTAL

UNIVERSITY OF LEEDS

KNOWFOR: ‘Improving the way knowledge on forests is understood and used internationally’

Lead institutions: Centre for International Forestry Research (CIFOR), International Union for Conservation of Nature (IUCN) and the World Bank Program on Forests (PROFOR)

Delivery partners: Multiple, including World Agroforestry Centre (ICRAF)

Thematic focus: Forests and land use

Country/countries of focus: Global

COP26 priority/priorities: Nature

Funder(s): Department for International development (DFID) (now Foreign Commonwealth & Development Office (FCDO))

Funding amount: £38 million

About the project

KNOWFOR was a five-year partnership between CIFOR, IUCN and PROFOR (2012-2017). Its objective was to provide high-quality original and synthesized knowledge products for a wide range of stakeholders in the forest and land use sectors in ways that would increase knowledge uptake. It addressed the disconnect between the considerable research on forests, trees and climate, and its use by policymakers and practitioners. The programme’s theory of change emphasized equipping decision-makers with knowledge needed to implement policies and practices that lead to more sustainable outcomes for forests and people.

There are inherent challenges in monitoring and evaluating programmes that try to influence policy and practice through knowledge generation, including issues of attribution, the relational nature of how change occurs, and long timeframes often involved. To address these challenges, KNOWFOR helped CIFOR, IUCN and PROFOR develop fit-for-purpose internal approaches to design, monitoring, evaluation and learning to enhance their effectiveness.

How the project is supporting the COP26 priorities

Forest and wetland protection, sustainable land management including agroforestry, and restoration of forest and tree-based ecosystems and their services offer significant opportunities to mitigate and adapt to climate change. The COP26 ‘Nature’ priority of safeguarding ecosystems, protecting natural habitats, and keeping carbon out of the atmosphere addresses these opportunities.

Although ‘nature-based solutions’ to the climate crisis hold substantial promise, they must be designed and implemented in ways that ensure environmental integrity (i.e. real emission reductions), protect ecosystems, and enhance the rights and livelihoods of local people. In this context, policy makers and practitioners in the forest and land use sector need to be equipped with strategic knowledge, comparable evidence, reliable tools and systematic analyses that enable them to make the best decisions. The KNOWFOR programme responded directly to this need by bridging the gap between the supply and use of knowledge about forests, trees and climate.

Impact

Through the KNOWFOR programme, CIFOR and ICRAF (as a delivery partner to IUCN) helped change policies and practices related to forests, trees and climate. Impacts include: co-developing national and subnational policies to reduce peatland fires in Indonesia; supporting development of a national Payment for Forest Environmental Services policy in Vietnam; providing guidance on restoration through agroforestry systems in Brazil and Peru; and pioneering digital tools that had vast uptake, such as the Africa Treefinder app to help farmers find suitable tree species for restoration, and the Borneo and Papua Atlases to allow for independent monitoring of deforestation in oil palm and pulpwood concessions.

KNOWFOR also transformed the institutional cultures of CIFOR and ICRAF through promoting a more systematic approach to translating research into impact. CIFOR-ICRAF as a merged organisation is now much better placed to contribute to the nature-based solutions needed to tackle the climate crisis through clear research-for-development pathways.

The resilience and sustainability of the Mekong delta to water and sediment fluxes

Lead institution: University of Hull

Delivery partners: Southern Institute of Water Resources Research, Can Tho University, University of Southampton, University of Exeter

Thematic focus: Delta resilience and sustainability under climate change

Country/countries of focus: Viet Nam

COP26 priority/priorities: Adaptation and resilience 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.'

Funder(s): National Environmental Research Council (NERC)

Funding amount: £440,914

About the project

A three-year project, funded by the NERC-GCRF Newton Fund, focusing on the evolving flood risk and resilience of the Mekong delta to future water and sediment fluxes. The delta is home of 18 million people, provides bountiful ecosystem services of global importance, but is under stress due to increases in salinity driven by tidal intrusion.

Using historical field data combined with hydrodynamic modelling, we investigated the relative contribution of the various drivers of tidal intrusion into the delta. These include, sea-level rise, land subsidence and channel erosion caused by river dams and sand mining. Disentangling the various contributions of these drivers showed that across the next two decades channel erosion will account for almost all of the projected tidal intrusion, with sea level rise contributing only modestly and over longer timescales. This enabled the generation of future projections of tidal intrusion under a range of policy, regulation and climate change scenarios.

How the project is supporting the COP26 priorities

We demonstrate that, within the next two decades, the tidal intrusion into a mega-delta will increase dramatically. We show that this transition is dominated by rapid channel erosion caused by a combination of sand mining and reductions of basin supplied sediment, while sea-level rise and land subsidence are found to function along longer time scales (i.e. by 2100). Our findings map directly on the Adaptation and Resilience 'Helping people, economies and the environment adapt and prepare for the impacts of climate change' COP26 priority. It is imperative to identify correctly the dominant drivers

of this tidal expansion in vulnerable river deltas in order to develop viable mitigation and adaptation strategies. Attempts to maintain climate resilient deltas globally will fail unless they include efforts to establish, sustain and enhance positive sediment budgets into these systems.

Impact

We have submitted our findings for publication in a high impact international journal. Our analysis has been disseminated to our Vietnamese partners and we are currently working towards organising stakeholder events in Vietnam, which have been curtailed by COVID. Our aims are to present the findings to Ministries in Vietnam, including in the Ministry for Agriculture and Rural Development and are engaged in producing a policy brief in liaison with the British Embassy in Hanoi. Together the policy brief and workshop will ensure the outcomes and findings from the project are incorporated within local and regional stakeholders into management strategies and aid the region in the effective decision making and policy implementations required.

Rising from the depths: Utilising marine cultural heritage in East Africa to help develop sustainable social, economic and cultural benefits

Lead institution: University of Edinburgh (it was Nottingham until Sep 2020 but the PI and the project moved to Edinburgh)

Delivery partners: Bournemouth University, University of Cambridge, University of York, University of Roehampton, University of Nottingham, Ulster University, Eduardo Mondlane University (Mozambique)

Thematic focus: sustainable living in coastal East Africa through marine cultural heritage

Country/countries of focus: four countries in East Africa (Mozambique, Tanzania, Kenya and Madagascar)

COP26 priority/priorities: sustainable development, adaptation and resilience, nature.

Funder(s): UK Global Challenges Research Fund (GCRF) under the Arts and Humanities Research Council (AHRC /R005443/1)

Funding amount: £1,958,906

About the project

The Rising from the Depths project aims to identify how the rich coastal and marine cultural heritage of East Africa can stimulate ethical, inclusive and sustainable development in the region. East Africa has been exploited over millennia for its resources and strategic trade connections. The resulting cultural heritage is one of the most undervalued and underutilised resources in East Africa. Marine cultural heritage is a finite resource, once destroyed cannot be recovered. These resources are under threat from rapid and profound changes driven by climate change and development pressures related to foreign investment in major infrastructure for offshore exploration and transport of goods. Rising from the Depths is investing £800,000 to fund 29 projects in the region, forming a UK- East Africa network of researchers and organisations investigating how the regions marine cultural heritage can promote sustainable livelihoods and directly benefit coastal communities in Kenya, Tanzania, Mozambique and Madagascar.

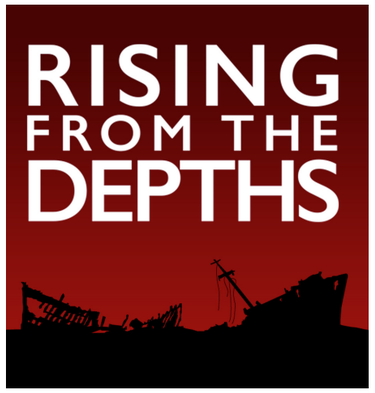

IMAGE: Community mangrove planting in Mida Creek (Kenya), as part of the project MUCH TO DISCOVER (PI Caesar Bita, National Museums of Kenya) funded by Rising from the Depths.

How the project is supporting the COP26 priorities

The project aims to stimulate sustainable development in East Africa. The region is one of the world's most vulnerable to climate change due to high exposure and low adaptive capacity. We have produced an index of vulnerability to coastal change for East Africa, which shows the importance of coastal habitats in reducing exposure to hazards, particularly in Kenya and Tanzania. Safeguarding coastal ecosystems is paramount for socioeconomic sustainability in the region. Rresults show that coral reefs protect over 2.5 million people from high levels of exposure and mangroves offer protection for 60% of the coastline. Results were recently presented in a keynote to the Coastal Hazards in Africa conference and will be disseminated widely to inform communities and decision-makers. Rising from the Depths is strengthening local research capacity through funding of 29 research projects in the region, all are directly or indirectly relevant to adaptation and resilience, promoting sustainable livelihoods in coastal communities of East Africa.

Impact

Rising from the Depths has stimulated co-creation of interdisciplinary research in East Africa through 29 projects funded in the region. This involve 64 organisations (39 from the region), including universities, government, NGOs and local communities, mostly through UK-East Africa collaboration. A systematic review showed that literature relevant to coastal change in East Africa is still limited and very few mention cultural heritage. Authors from East Africa contribute to only half of publications; of these only 18% involve UK-based authors. Rising from the Depths is strengthening local research capacity and already resulting in publications created by new UK-East Africa collaborations . Direct benefits to coastal communities are expected from all projects and starting to be realised, as evidenced in Mida Creek (Kenya) where the project facilitated new sources of income to local women and community-led mangrove restoration while promoting cultural heritage. It is expected that findings from the index of vulnerability to coastal change for East Africa will inform and influence risk reduction decisions.

THE UNIVERSITY of EDINBURGH

Sustainable production of biodiesel from waste cooking oil in Egypt

Lead institution: London South Bank University (LSBU) – Professor Basudeb Saha (Principal Investigator, LSBU) and Dr Omar Aboelazayem (Research Assistant worked at LSBU for this project)

Delivery partners: The British University in Egypt (BUE) - Professor Mamdouh Gadalla

Thematic focus: Sustainable biofuel production

Country/countries of focus: Egypt

COP26 priority/priorities: Clean Energy

Funder(s): The British Council (UK) and STDF (Egypt) through Newton Institutional Links Programme (Project IDs 261862377 and 27738)

Funding amount: £180,706 (total)

About the project

This UK-Egypt collaborative project has systematically explored a sustainable solution for solving some critical problems in Egypt including lack of diesel fuel and waste management. The Egyptian waste cooking oil (WCO) has unique properties as a result of extensive use of cooking oil by restaurants/food industries in Egypt. The Egyptian WCO contains very high acid value (exceeding 18 mg KOH/g oil) and hence it requires several pre-treatment processes.

In this project, we have developed a sustainable solution for converting Egyptian WCO into biodiesel without any pre-treatment requirements using a single step reaction. The process has successfully established a methodology where WCO is fed to the reactor at the developed optimal conditions for producing high quality biodiesel. The collected WCO from the villages in Egypt is currently being valorised into biodiesel, which could be used in power generation and agricultural vehicles and developing self-sufficient energy generating villages in Egypt.

How the project is supporting the COP26 priorities

The project has addressed a number of COP26 priorities including Adaptation & Resilience, Nature, Clean Road Transport, and Finance. The project has provided a sustainable solution for the conversion of low-quality waste cooking oil (WCO) into biodiesel in a one-pot process. We have suggested an adaptation for the existing method for WCO disposal for biodiesel production. We have ensured the resilience of

the produced biodiesel in replacing petroleum diesel at the existing infrastructure. Eliminating the disposal of WCO will significantly reduce the steps for wastewater treatment plants and hence provide greener environment. The results from this study are of importance in industrial production of biodiesel from waste materials to replace fossil fuels. Our produced biodiesel gives more than a 60% greenhouse gas saving compared to regular fossil diesel. This innovative greener and sustainable process provides renewable energy solutions for the resource-poor people in Egypt in a sustainable manner.

Impact

The project has provided a sustainable solution for fuel shortage in Egyptian agricultural villages. The collected WCO in villages could be economically converted into high quality biodiesel with 98.5% (w/w) yield, where 1 kg of WCO could produce 0.985 kg of biodiesel using a single-reaction. The technology is promoting economic collaboration, creating job opportunities and economic growth in remote-villages in Egypt and improving the quality of life for Egyptian people (reduction of greenhouse gas emission, environmental pollution control etc.). Based on a study on El-Gilany Village, El-Fayoum City in Egypt, the consumption of diesel fuel is 3000 L/day for agricultural vehicles. Additional diesel is also required occasionally for electric generators during the shortage of electricity from the grid. The village produces approximately 900 L/day of WCO that are disposed in the drains. The produced WCO has potential to satisfy 30% of the required diesel fuel in Egyptian villages.

London South Bank University
EST 1892

BUE
The British University in Egypt
الجامعة البريطانية في مصر

Weather and Climate Science for Service Partnership Programme (WCSSP)

Lead institution: Met Office

Delivery partners: China Meteorological Administration (CMA), Institute of Atmospheric Physics (IAP), South African Weather Service (SAWS), National Institute of Amazonian Research (INPA), National Institute for Space Research (INPE), National Centre for Monitoring and Early Warnings of Natural Disasters (CEMADEN), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), National Disaster Management Agency (NADMA), Indonesian Meteorological, Climatological and Geophysical Agency (BMKG), Vietnam Meteorological and Hydrological Administration, Ministry of Earth Sciences (MoES)

Thematic focus: Weather, Climate Change, Resilience

Country/countries of focus: China, South Africa, Brazil, Philippines, Indonesia, Malaysia, Vietnam, India

COP26 priority/priorities: Adaptation and Resilience 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.'

Funder(s): The Newton Fund (UK Government)

About the project

Exposure to extreme weather and climate events threatens the sustainability of economic development and social welfare across the globe. The Weather and Climate Science for Service Partnership (WCSSP) builds the basis for strengthening the resilience of vulnerable communities to weather and climate variability.

In South Africa, for example, a partnership between the Met Office and South African Weather Service is improving weather forecasting practices and enhancing the capability to deliver severe weather warnings to protect lives and livelihoods. In Brazil, the partnership is developing the capability to underpin services to inform decision makers in climate mitigation and adaptation strategy whilst the partnership in India is improving understanding and predictions of the monsoon.

How the project is supporting the COP26 priorities

The WCSSP supports the COP26 priority, Adaptation and resilience, 'Helping people, economies and the environment adapt and prepare for the impacts of climate change.' Enhancing understanding of climate change and extreme weather is the foundation for developing services which can help governments, businesses and communities take action in advance to lessen or avoid its impacts.

WCSSP is developing new scientific capability and pulling it through into the development of services which can be used to support weather and climate-smart economic development and help make decisions at both policy and operational levels. In China new tools have been produced to help urban planners and decision makers assess and mitigate the risks from climate change. For example, the Shanghai Municipal Government have included policy recommendations from the WCSSP programme in its 2017-2035 Master Plan.

Impact

WCSSP is nurturing an international community of early career researchers in weather and climate science and so far has facilitated over 100 exchange visits between partner organisations. These have been invaluable in forging strong, mutually beneficial relationships which exchange and accelerate scientific knowledge and expertise. For example, the visits have been a major contributing factor to the more than 400 peer-reviewed research articles which have been published in internationally respected journals around the world.

In China a new product was developed to predict rainfall months in advance over the Yangtze river basin. This information is used by our delivery partners in China to advise different water management organisations in the Yangtze basin such as the Three Gorges Dam. Advanced warning of above or below average rainfall help organisations to prevent flooding, generate hydroelectric energy and manage water resources.

Met Office

Women's grassroots leadership for climate resilience in sub-Saharan Africa

Lead institution: CAMFED

Delivery partners: School graduates in the CAMFED Association, government ministries, school communities, EARTH University

Thematic focus: Girls' education, women's leadership and climate-smart strategies for adaptation and resilience in rural sub-Saharan Africa

Country/countries of focus: Zambia, Zimbabwe, Tanzania, Malawi, Ghana

COP26 priority/priorities: Adaptation & Resilience

Funder(s): UK Public, AKO Foundation, Mastercard Foundation

Funding amount: £1,385,000

About the project

CAMFED is an international NGO founded in 1993. We have supported 4.1 million children to go to school in sub-Saharan Africa, and developed a unique network of 157,000 young women leaders – the CAMFED Association. By educating girls and empowering women to lead climate-smart action, we are building resilience in rural Africa.

CAMFED Association "Agriculture Guides" volunteer their time to train smallholders in sustainable farming techniques to adapt to the effects of climate change, improve yields and reduce carbon emissions. They work with schools, community groups and local government to construct cleaner cook stoves, protect trees and biodiversity, provide nourishing school meals and reduce waste.

Our Agriculture Guide Programme builds on the foundations of the FCDO's investment in girls' education, including the Girls' Education Challenge.

As we scale, we are taking a mixed method, participatory approach to research our impact on adoption of climate-smart techniques by rural women and associated outcomes.

How the project is supporting the COP26 priorities

Across rural sub-Saharan Africa, climate change is exacerbating entrenched gender-based inequalities, reducing smallholder yields and increasing hunger and child marriage. Carbon emissions are <4% UK average. Governments have prioritised climate-smart agriculture but women's lack of access to land, assets and agricultural advisory services hinder widespread adoption.

CAMFED is supporting COP26 priorities for adaptation and resilience in sub-Saharan Africa by:

1. Enabling marginalised girls to go to school and succeed
2. Building women's autonomy, skills and leadership for climate-action
3. Inspiring community adoption of climate-smart agriculture

These activities are improving climate resilience in rural communities in some of the poorest parts of sub-Saharan Africa and also averting future carbon emissions.

Our model – for which we won the 2019 UN Global Climate Action Award at COP25 – is recognised as an effective and scalable approach led by young African women.

Impact

CAMFED Association Agriculture Guides have reached 8,500 people with climate-smart techniques. We will reach a further 50,000 people in rural Zimbabwe alone over the next two years.

Agriculture Guides are inspiring adoption of innovative and Indigenous climate-smart techniques such as inter-cropping, mulching and affordable irrigation. They are supporting smallholder farmers to better manage droughts, floods and weather unpredictability caused by climate change. They are encouraging sustainable intensification of production which reduces child hunger and, at scale, can avert future deforestation. Pilot outcomes achieved include up to 3x yields, improved incomes, better household nutrition and new jobs.

As Agriculture Guides, young women are gaining respect and recognition for their leadership, and access to assets and land, unlocked by the support of traditional leaders.

As we scale we are researching our impact on climate resilience, productivity, food security and girls' access to education. We are tracking stakeholder engagement and opportunities for replication.

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