BRITISH COUNCIL

Delivering the Newton Fund in Latin America

Delivering

Newton Fund

Foreword

Science and technology have played a central role in shaping the contemporary world. We live in an age of instant communication, mRNA vaccines, artificial intelligence, big data algorithms, and space travel. Innovation and research contribute to human wellbeing, economic development, and the formulation of public policies that respond to real-world complexities.

As we witness significant progress in various fields, we must also acknowledge that global society is confronting pressing and intricate challenges. Issues such as the COVID-19 pandemic, escalating biodiversity loss, the unmistakable impacts of climate change, and persistent social inequalities all underscore the formidable obstacles that lie ahead in the decades to come. Today, it is becoming increasingly apparent that the difficulties we face are not limited to specific individuals or countries but are shared globally. To tackle them, we require a science that transcends borders and creates knowledge that benefits those who need it the most.

The Newton Fund was created in 2014 with such challenges in mind. In its early stages, it supported projects in four Latin American countries: Colombia, Brazil, Mexico, and Chile. In 2017, Chile stepped out of the programme and Peru joined. In its final stage, between 2017 and 2021, the Newton Fund financed programmes in the countries here reported: Colombia, Peru, Brazil, and Mexico. Each project involved a Latin American partner and a British counterpart that joined forces in pursuit of a common goal.

The British Council, acting as an implementing partner, played a pivotal role in defining priority areas, issuing calls for proposals, and identifying projects to be funded. Additionally, through the British Council, the Newton Fund contributed over £22.6 million to the region, an amount that was subsequently reciprocated by partner countries through a match funding mechanism. The British Council thus strengthened links with numerous institutions in Latin America, including CNPq, Minciencias, Conacyt, Concytec, and FAPESP, to name a few.

Latin America is a region with a long scientific tradition. Its specialists have made and continue to make notable contributions in fields such as botany, aerospace engineering, and medicine.

From the outset, the Newton Fund sought not only to promote the creative and resilient spirit characterising Latin American research, but also horizontal relationships between British and local partners. The idea was to foster equitable partnerships as a key to effective collaboration. By working together on an equal footing, research and scientific endeavors can achieve greater success.

This document seeks to highlight important milestones reached by the British Council and the Newton Fund over a timespan of eight years. During this period, the institution played a pivotal role in strengthening links, fostering professional networks, and consolidating the United Kingdom's position as a strategic partner for scientific research in the selected countries. Apart from financing 358 projects, the initiative also gave rise to a fruitful exchange of ideas that transcended geographical boundaries.

A significant historical challenge that science and technology in the region must overcome is the exclusion of certain groups, such as women, economically disadvantaged populations, and indigenous communities, from accessing material and scientific progress. Therefore, in addition to collaborating with established scientific centres, programmes supported by the British Council and its local partners in Latin America involved communities in underserved areas of the Brazilian Amazon, the Colombian coast, the Peruvian Andes, and the Mexican highlands. In Colombia, the project entitled "Useful Plants and Fungi of Colombia", for example, relied on the millenary knowledge of communities around the Cajambre River to document and identify fungi and wild plants capable of generating a value chain.

Other successful projects helped confront energy poverty in Mexico, identify climate-resilient seeds in Peru, provide green energy to remote communities in the Amazon, and develop tests for neglected tropical diseases in Colombia. In the appendixes, the reader will also find an extensive list of the projects benefited per country, as well as data regarding the research teams of the numerous universities, research centres, government agencies, and private foundations that collaborated in this colossal effort.

Scientific progress is a long and rigorous journey that demands persistence. Isaac Newton, in whose honour this fund was named, once acknowledged that his intellectual accomplishments were made possible by "standing on the shoulders of giants." We firmly believe that the Newton Fund's funding efforts have stood on the shoulders of giants, namely researchers from the region and the United Kingdom, who are dedicated to advancing scientific knowledge and addressing the world's current challenges. Their collaborative efforts and extensive research as part of this Fund have yielded significant outcomes and positive impacts. These benefits bring advantages not only to the academic sector but also, more crucially, to communities in key areas throughout Latin America.

I hope you enjoy reading this report,

Camila Morsch

Table of contents

2 Foreword

4 Overview of the Newton Fund

6 The British Council's Role

9 **COLOMBIA**

11 Our Work in Colombia

15 Plants and Fungi: A Sustainable Future Flourishing in Colombia

20 Coffee Awakens the World and Might Light it up in the Future

23 Creating Rapid Tests for Tropical Diseases: A Possible Future for Colombia

26 Lead- and Mercury-Free Water for Colombia's Mining Communities

29 **BRAZIL**

31 Our Work in Brazil

34 Electrifying the Amazon

38 The Zika Epidemic in Brazil: The Enemy Is Not Only The Mosquito, But Also Disinformation

41 In Unity There Is Strength: Coastal Biodiversity and Public Policies on the São Paulo Coast

44 Using Forensic Anthropology to Comprehend State Crimes

47 **MEXICO**

49 Our work in Mexico

53 The Blue Economy: The Cozumel Current Can Be a Source of Clean Energy for Communities in the Mexican Caribbean

56 Mexico at the Medical Forefront: Researchers Develop A Device That Explores Heart Functioning in a Novel Way

59 Mexico City Seeks to Improve Water Security by Rescuing Wetlands

62 From the Bottom-Up: Communities and Scientists Unite to Combat Energy Poverty for 2030

66 **PERU**

68 Our work in Peru

72 The Water that Nourishes Peruvian Cities Springs from the Heights of the Andes: The Time Has Come to Protect the Andean Wetlands

75 Towards a Botanic Garden in Peru

78 Tuberculosis in Peru Contains a Secret: Deciphering its Genome Could Help Fight TB

81 Seeds of Hope: In the Face of Climate Threats, Identifying Varieties of Climate-Resilient Cereal Can Lead to Better Harvests for Small-Scale Farmers Facing Vulnerability

83 **ANEXOS**

84 **Colombia**
84 Appendix 1
89 Appendix 2
94 Appendix 3
100 Appendix 4
106 Appendix 5

109 **Brazil**
109 Appendix 1
117 Appendix 2
121 Appendix 3
125 Appendix 4
128 Appendix 5

129 **Mexico**
129 Appendix 1
134 Appendix 2
136 Appendix 3
146 Appendix 4
149 Appendix 5
150 Appendix 6

152 **Peru**
152 Appendix 1
154 Appendix 2
156 Appendix 3
158 Appendix 4
162 Appendix 5

163 **Red Latam**
163 Appendix 1
167 Appendix 2
173 Appendix 3

175 **CREDITS**

176 **REFERENCES**

Overview of the Newton Fund

Created in 2014, the Newton Fund formed part of the UK's Official Development Assistance Programme (ODA) and was managed by the Department for Business, Energy and Industrial Strategy (BEIS) with the central goal of building research and innovation partnerships to address scientific and development priorities in partner countries, as well as promoting their economic growth and social wellbeing.

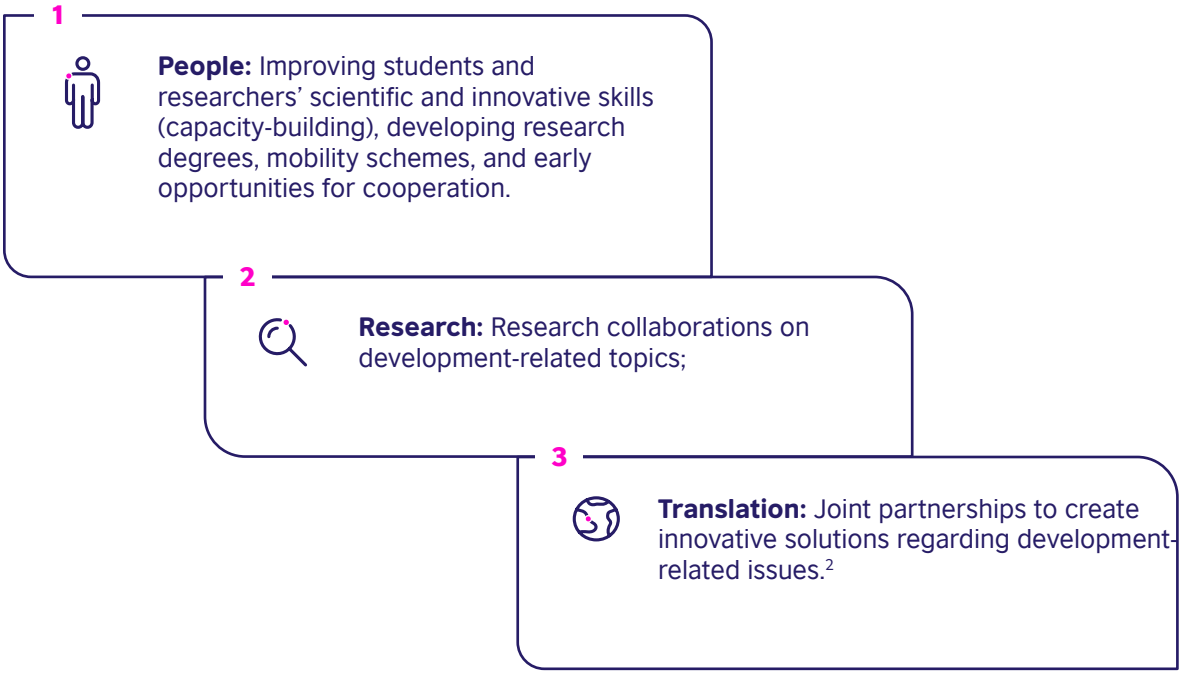
The Newton Fund initially had an overall budget of £375 million (£75 million per year, throughout 5 years), which increased to a total available amount of £735 million by 2021. To allocate these funds, BEIS chose seven implementing partners, which were the Academy of Medical Sciences, the British Academy, the British Council, the Met Office, the Royal Academy of Engineering, the Royal Society, and UK Research and Innovation. These institutions then established agreements with local partners in 18 selected countries, which were chosen on the basis of being emerging economies with a high potential to develop and deliver excellent scientific innovation.

During its operation, the Newton Fund established partnerships to co-finance, develop, and execute programs, and to announce calls for participation that science, technology, and innovation projects could apply for. These programs were implemented through agreements with approximately 2,000 public and private partners[1] from the partner countries, and were financed through matched funding. This means that for every pound sterling contributed by a British partner, local partners would contribute an equivalent amount, either in cash or, in some cases, in kind.

Initially, the Newton Fund financed projects in four Latin American countries: Colombia, Brazil, Mexico, and Chile. In 2017, after joining the Organisation for Economic Cooperation and Development (OECD), Chile left the program and Peru joined. The main local partners included the Colombian Ministry of Science, Technology, and Innovation (Minciencias), the Peruvian National Council of Science, Technology, and Innovation (Concytec), the Mexican National Council of Science and Technology (Conacyt), the Brazilian Research Support Foundation of the State of São Paulo (FAPESP), the National Council of State Research Support Foundations (CONFAP), and the National Council for Scientific and Technological Development (CNPq), among others.

1 Department for Business Energy & Industrial Strategy. n/d. "The Newton Fund - Findings and Recommendations from Tetra Tech's Final Evaluation Report". https://www.newton-gcrf.org/wp-content/uploads/2022/07/Newton-Fund-Evaluation-Summary-July-22_v6.pdf.

The projects supported by the Newton Fund focussed on three fundamental pillars of work:



In addition to encompassing these three pillars of work, the projects supported by the Newton Fund reflected a number of national priorities, jointly decided by the UK and local partners. These priorities varied from country to country, but in Latin America they included items related to innovation, biodiversity, the environment, sustainability, and public health, among others.

Many of the projects supported by the Newton Fund had an important social component, and involved local communities, vulnerable groups, and historically marginalized populations.

Through the Newton Fund, the UK has been able to build strong bonds with Latin American partner countries, contributing not only to scientific development, but also to collaboration between institutions and research teams that otherwise would hardly have worked together.

2 Department for Business, Energy and Industrial Strategy (BEIS). 2020. The Newton Fund Operational Framework. https://www.newton-gcrf.org/wp-content/uploads/2020/10/Newton-Fund-Operational-Framework.pdf.

The British Council's Role

As an implementing partner, the British Council has played a crucial role in delivering the Newton Fund. The institutional objectives of the British Council include promoting educational cooperation by means of programs aimed at fostering high-quality joint research, capacity building, and facilitating the professional growth of researchers from emerging economies. It promotes excellence in scientific production, strengthening bonds between the United Kingdom and the countries in which the British Council operates.

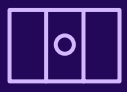
These factors, coupled with the strong relationship built with each of its partner countries over several decades, have facilitated the British Council's role as an implementing partner. Moreover, they have enabled the establishment of 50/50 partnerships with local partners and collaboration efforts with them to create and initiate joint calls for participation. Such efforts have facilitated submissions from the scientific community across diverse priority areas, in alignment with the goals of the Newton Fund.

In the case of Latin America, this resulted in the approval of 358 projects that benefited over 7,500 researchers, with a total distribution of £45.2 million as follows:

BRAZIL

£17 million,
supporting 117 projects in addition to 85 small-scale projects.

MEXICO



£8.3 million,
supporting 97 projects.

COLOMBIA

£17 million,
supporting 78 projects.

PERU

£2.3 million,
supporting 36 projects.

THE "BIODIVERSITY IN LATIN AMERICA" NETWORK

(this scheme finances projects between the United Kingdom and Argentina, Brazil, Chile, Colombia, Mexico, and Peru):[3]

£650 thousand,
supporting 30 projects.

3 Department for Business Energy & Industrial Strategy. n/d. "The Newton Fund - Findings and Recommendations from Tetra Tech's Final Evaluation Report". https://www.newton-gcrf.org/wp-content/uploads/2022/07/Newton-Fund-Evaluation-Summary-July-22_v6.pdf.

The main Newton Fund programmes implemented by the British Council in Brazil, Colombia, Peru, and Mexico were the following:

1. **Researcher Links:** Funding for binational workshops and early-career researcher mobility between partner countries and the UK.
2. **Institutional Links:** Funding for the development of research and innovation between institutions in the United Kingdom and partner countries in order to promote the link of projects with the commercial sector and technology transfer.
3. **Researcher Connect:** A professional development programme focussed on communication skills for international and multicultural environments, designed to meet global demands.
4. **Professional Development and Engagement:** Fostering the research ecosystem in partner countries, as well as capacity-building, offering spaces to promote exchange between experts from the UK and its partner countries;
5. **Newton Fund Impact Scheme:** Launched in 2019, the British Council implemented this programme to enable projects previously benefitted by the Newton Fund to seek additional resources allowing them to expand their impact through new activities.
6. **Newton Fund PhD Programme:** Full funding of doctoral study programmes for students from partner countries at UK universities.

The Biodiversity in Latin America Network was a key task. As part of the Institutional Links Programme, it funded research broadly focussed on documenting biodiversity and its links to society in understudied areas of Latin America. The two calls for participation launched for the network in 2017 and 2018 were aimed at researchers from institutions in Argentina, Brazil, Chile, Colombia, Mexico, and Peru in partnership with a British counterpart, resulting in the approval of 30 projects. This contributed not only to strengthening research on issues related to biodiversity, climate change, sustainable livelihoods, and restoring natural capital, but also to the construction of new links between Latin American research groups and their counterparts in various UK institutions, thus opening the possibility of establishing long-term sustainable research relationships in the region.

All these efforts have achieved tangible results, such as strengthening public policies, promoting scholarships for study abroad, organising international workshops, producing research papers, creating new methodologies, and developing science and technological innovation, among others.

This document brings together a compilation of projects that have achieved successful implementation, such as a research project aimed at converting ocean currents into green energy on the Mexican Caribbean coast, or the transformation of coffee waste into electricity by scientists in Colombia. Other examples include a collaboration in Peru that laid the path for a national botanical garden and another in Brazil that supplied remote communities in the Amazon with green energy.

These projects showcase the very essence of the Newton Fund: mutual cooperation for social development and sustainability, utilizing science to address significant challenges that nations face, and fostering dialogues between experts from diverse locations who amalgamate their knowledge in multiple domains to attain shared objectives. These examples are indicative of what can be accomplished when countries and institutions collaborate towards ambitious goals.

Colombia


SALSAMENTA

Our Work in Colombia

TOTAL JOINT INVESTMENT

£17 MILLION

TOTAL NUMBER OF PROJECTS

78

PROGRAMMES IMPLEMENTED

- RESEARCHER LINKS WORKSHOPS
- RESEARCHER LINKS TRAVEL GRANTS
- INSTITUTIONAL LINKS
- PROFESSIONAL DEVELOPMENT AND ENGAGEMENT
- PHD SCHOLARSHIPS

PARTNERS

- ICETEX
- MINCIENCIAS
- INNPULSA
- FUNDACION CORONA
- FUNDACIÓN GÉNESIS
- DEPARTAMENTO NACIONAL DE PLANEACIÓN

NUMBER OF UK INSTITUTIONS

72

NUMBER OF COLOMBIAN INSTITUTIONS

65

Our Work in Colombia

Colombia is a country of enormous potential, in every sense. It is the largest economy in northern South America, as well as one of the megadiverse countries in the world. Official data estimate that 25% of its population—approximately 12.5 million people[4] —is aged between 14 and 28, which implies that it is a country with a high proportion of youth. Colombia's cultural richness is linked to its territorial diversity, which includes plains, mountains, jungles, coasts on the Pacific and the Caribbean, and some of the most thriving and creative cities on the continent, such as Bogotá, Medellín, and Cali. In addition, it has small communities in the Orinoco and Amazon basins, where inhabitants speak at least one of the approximately 65 indigenous languages spoken in Colombia,[5] and the only contact they have with a city is through a long river journey.

However, Colombia, like other countries in the region, also faces major challenges, including biodiversity loss, social inequality, and the aftermath of a protracted armed conflict. The same holds true for the economy, which is growing at a slower rate than most Colombians would like.

From 2014 to March 2022, the Newton-Caldas Fund—through its implementing partners—financed science and innovation projects in Colombia aimed at helping address these and other challenges and at strengthening the ties between Colombia and the United Kingdom. The British Council, in association with its local partners—particularly the Ministry of Science, Technology, and Innovation (Minciencias)—applied in that period more than £17 million to 78 projects distributed among five programmes, some of which included the 32 states of Colombia (referred to as *departamentos*), in addition to Bogotá, the Capital District.[6] To date, the Newton-Caldas Fund is the largest cooperation effort in science and technology signed between the government of Colombia and a partner country.

Luis Calzadilla, Head of Science and Innovation at the British Embassy in Bogotá, stated that "One of the main contributions made by the Newton-Caldas Fund is that it systematised scientific collaboration and created a formal mechanism allowing existing relationships between researchers to expand". This Fund has made additional noteworthy contributions, such as emphasizing the role of Colombian science and technology in achieving crucial objectives of the global agenda—such as the Sustainable Development Goals—and in creating networks of researchers from both countries.

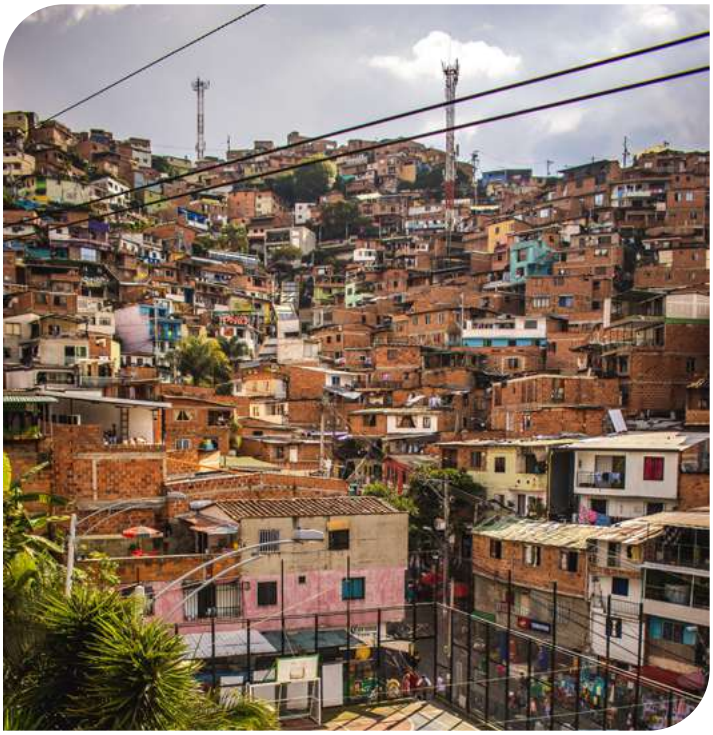
Given Colombia's complex reality, the United Kingdom and Colombia decided that in its final stage the Newton-Caldas Fund would focus on six key areas: bioscience, sustainable peacebuilding, sustainable agriculture and food security, health sciences, and strengthening the innovation ecosystem. Following these guidelines, the programmes implemented by the British Council and Minciencias sought to address issues central to Colombian reality, providing scientific development with a social and innovative perspective. The British Council, with the collaboration of British and Colombian institutions and support from the Newton-Caldas Fund, has focused on prioritizing projects ranging from documenting Colombia's vast array of fungi and plants to researching neglected tropical diseases affecting populations living in remote Amazonian jungles.

4 Departamento Administrativo Nacional de Estadística de Colombia. 2020. "Panorama sociodemográfico de la juventud en Colombia". https://www.dane.gov.co/files/investigaciones/genero/informes/informe-panorama-sociodemografico-juventud-en-colombia.pdf.
5 Ministerio de Cultura de Colombia. "Lenguas Nativas y Criollas de Colombia". n/d. Consulted January 20, 2023. http://mincultura.gov.co/areas/poblaciones/APP-de-lenguas-nativas/Paginas/default.aspx.
6 Embajada Británica Colombia, Newton-Caldas Fund. Newton-Caldas Fund Report 2014-2020. Colombia, 2022.

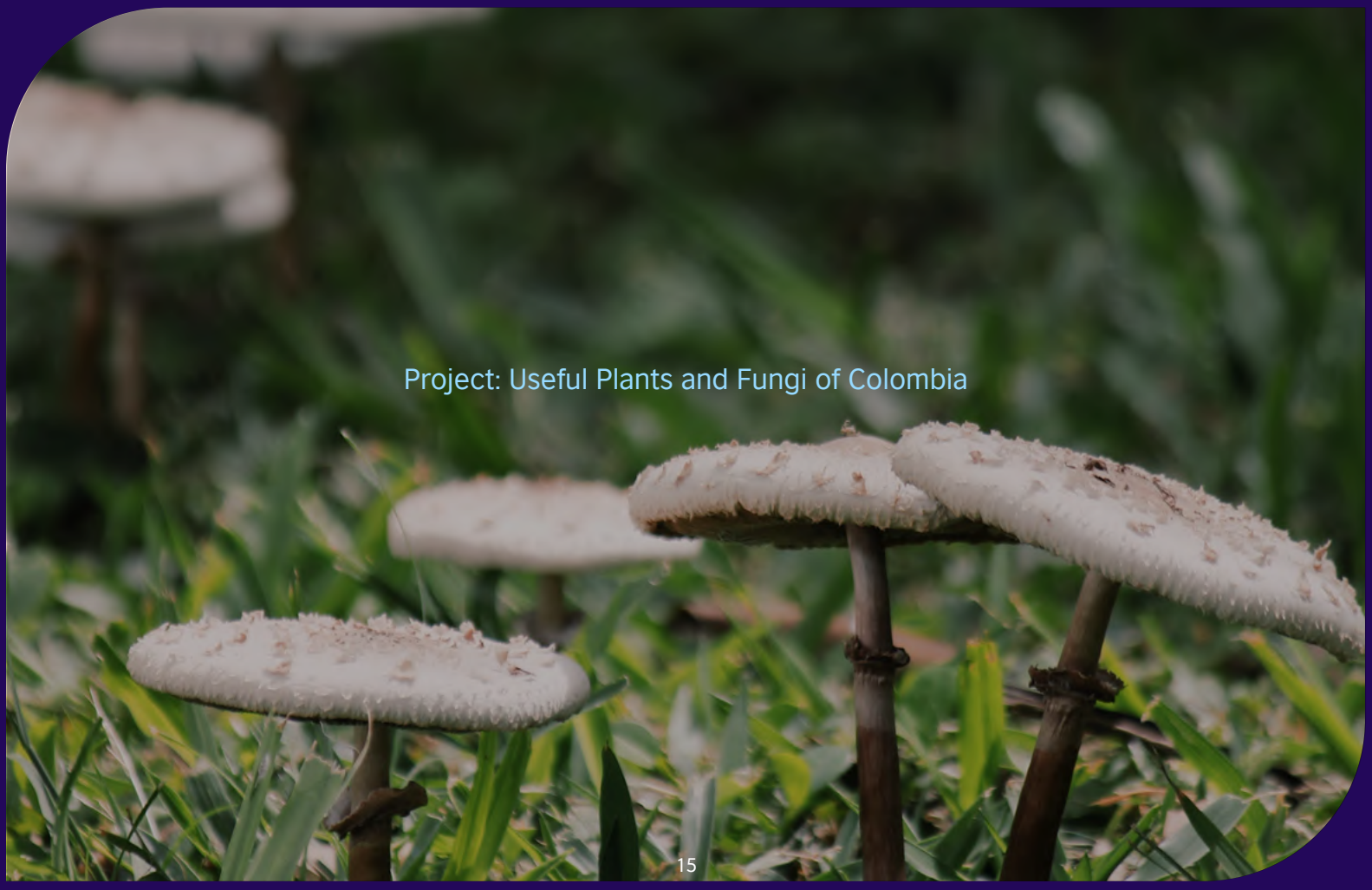
Given the state of the Colombian scientific ecosystem, human resource development is a priority. Colombia still needs more trained researchers to study its national reality. For this reason, exchange programmes and workshops played a central role in many of the efforts of the British Council and Minciencias. The British Council's Researcher Links and Professional Development & Engagement Programmes, in particular, have contributed to this mission, while enhancing the development of science in the UK and Colombia.

Some of the most important takeaways from the Newton Fund in Colombia include recognizing the role of collaboration in co-creation, the value of co-financing, and the fundamental importance of developing equitable partnerships. The latter emphasizes a more equal style of cooperation, in which both parties support each other and share equal responsibility in the project. The Newton-Caldas Fund has been cultivating this approach to collaboration in Colombia. As Luis Calzadilla explained, "It is futile for one partner to create something without taking the other partner into account." Angela Ramirez, Senior Manager for the Newton Fund at the British Council, further added, "Engaging in international work promotes an intercultural experience that enriches science through a diversity of viewpoints and concepts originating from the connections between participating nations, while also fostering professional growth for both local and foreign researchers. As they advance their scientific expertise, these researchers also refine their soft skills and expand their potential to cooperate in a global context."

Several prospects for refining the work of these types of funds exist. These may include connecting financing with development and business initiatives, as well as seeking new ways of engaging industry in technological development. This can be complicated for a country like Colombia, in which it is still necessary to strengthen the relationships between academia and the private sector. In this same line, it is also crucial to assess the sectors that will be affected by specific innovations and undertake consultative processes between scientists and the stakeholders for whom technologies are intended.



Plants and Fungi: A Sustainable Future Flourishing in Colombia



Project: Useful Plants and Fungi of Colombia

There is much about the natural environment that humankind has yet to discover. A significant portion of the ocean remains unexplored, and we frequently discover new species which remind us of the vast secrets still contained in the world's biodiversity. To contribute to sustainable growth and community development through biodiversity, a large team of Colombian and British experts have undertaken the mission of exploring and cataloguing Colombia's plants and fungi.

Based on the latest scientific understanding, Colombia is the second most biodiverse country on the planet. To comprehend the extent of its diversity, it is worth noting that around 150,000 types of fungi are currently recognized, with nearly 5% existing in Colombia. Nonetheless, as per projections, and with the help of scientific endeavors as the one here presented, the total number of identified species worldwide might surge to 2.2 million, out of which 300,000 could potentially exist in Colombia, providing all sorts of benefits to the country's population.

Although fungi and plants could in general make crosswise contributions to all the Sustainable Development Goals of the 2030 Agenda, since their use can directly benefit the environment, promote zero hunger or fight poverty, through this project, they would be mostly contributing to Goal 1 (No Poverty), Goal 15 (Life on Land), and Goal 17 (Partnerships for the Goals).

This large-scale project was carried out by the Royal Botanic Gardens, Kew (RBG) of the United Kingdom in collaboration with the Alexander Von Humboldt Biological Resources Research Institute of Colombia (IAVH by its acronym in Spanish)—with support from the British Council, representing the Newton Fund, and the Ministry of Science, Technology, and Innovation—within the framework of the Professional Development & Engagement Programme. Numerous researchers participated in this effort led by Dr Mauricio Diazgranados, lead researcher, Dr Tiziana Ulian, senior research leader, and Tatiana Rojas as the project manager for Colombia. This joint collaboration involved 50 researchers from the RBG, 35 from the IAVH, and 34 from other institutions.

In general, the researchers focussed their activities on four areas of work:

1. Collecting information about useful plants and fungi, starting with pilot regions: Bahía Solano, Otanche, and Becerril.
2. Creating sustainable value chains based on the plants and fungi identified in the aforementioned regions.
3. Using multiple communication platforms to widely disseminate knowledge and findings.
4. Using value chains to explore the local community, food security, health, and dietary variety.

The research, which was carried out between 2019 and 2022, developed an information system with different tools and platforms that facilitate the creation, access, and transmission of knowledge about plant and fungi species located in Colombia. In total, 26 academic institutions and 119 researchers were involved, creating a total of 140 research products, including books, technical reports, manuscripts for scientific journals, videos, and digital applications, among others.[7]

A remarkable aspect of the project and most of its output was the work done with and for the communities. A sample of this is the "Somos historias" initiative [We Are Stories], which focussed on teaching and training community members in Colombia to share stories about their relationship with plants and the environment. This exercise was carried out in the municipalities of Becerril and Ovejas, and in the Cajambre River area with the intention of identifying and retrieving the ancestral knowledge of the inhabitants around *naidi* (*Euterpe oleracea*) and *guáimaro* (*Brosimum alicastrum*). These are species with which community members have always coexisted, maintaining a bond and a sense of stewardship towards them.

To achieve the objective, a methodology was designed to facilitate the transmission of knowledge and its dissemination using diverse activities. This made it possible to empower community members and provide them with tools to communicate through formats such as photography, audio-visual reporting, and illustration. Workshops were held with this objective in mind. A few of these include "Reporters in Action", "A Journey through the Memory of our People", "In Search of Stories", "Sharing Stories, In Search of Inspiration", "My Personal Relationship with *Guáimaro*," among others.

"We've learned a lot of things we didn't know before: how to use a camera, tripod, and microphones. Now I know that a photo has symmetry, it has planes, and, the truth is that I liked it a lot," recognised Lorena Pérez, an inhabitant of Ovejas.

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The *guáimaro* tree was one of the species highlighted in the *Somos Historias* initiative and the "Plants and Fungi of Colombia" project. It is an excellent example of how endemic species can contribute to sustainable development if information about their properties and sustainable use is disseminated and emphasis is placed on ecosystem conservation.

In Becerril, a municipality of approximately 15 thousand inhabitants where the *guáimaro* tree is considered sacred, an initiative was carried out to reclaim and promote this species in order to conserve the forests of the region and, at the same time, encourage the sustainable growth of the local economy. The objective was to use *guáimaro* seeds, which can be roasted and ground into flour containing nutritional elements and antioxidant properties similar to those of almonds, peanuts or walnuts. In addition, the fruit can be

7 Instituto Humboldt. December 1 2022. "Lanzamiento. Catálogo de Plantas Útiles y Catálogo de Hongos". Colombia. https://www.youtube.com/watch?v=vYknmvt6aGI.

used to prepare a variety of dishes, and has a texture similar to cassava or potato. Currently, several families in the region are marketing *guáimaro* flour and have thus begun to create value chains around this product.

The Colombia Network of Natural Ingredients is starting to promote the trade of these types of products. This network brings together producers, marketers, exporters, and other participants in the value chains of different products derived from Colombia's biodiversity, such as food, agricultural raw materials, medicines, textile fibres, cosmetics, tinctures, etcetera.

Although this network is in its first stage, it is already possible to gain access to it through the RedIn Colombia internet portal. This website makes it possible to connect and articulate producer and consumer activities in order to promote fair trade in an environment of sustainable practices and green growth.

The technological solution is user-friendly, requiring only registration of the producer, product, and its features to establish a company profile. This enables access to an online market in which both direct customers and partner businesses can be identified to enhance the value chain.

According to the researchers, other notable deliverables produced by the research included the Colombian Catalogue of Useful Plants and the Colombian Catalogue of Fungi. These catalogues aim to improve the understanding of and capitalise on the sustainable use of these natural resources by cataloguing more than 28 thousand species of plants and 7 thousand species of fungi. Almost a quarter of these plants can be of use to humankind.

Although Colombia has been creating plant catalogues since the eighteenth century, which are still mostly reliable, the colossal work invested in the aforementioned catalogues has added value, for example, the taxonomic validation of species, their location, and the creation of a standardised language "to name medicinal plants in one way or edible plants in another way," claims Dr Carolina Castellanos, senior researcher at IAVH.

As Dr Aida Vasco, President of the Colombian Association of Mycology, stated, "We have to respond to a series of economic, environmental, and health crises that nature is facing. Previously, exploiting biodiversity economically was considered to be [abusive]. However, today we think that bioeconomy is the adequate and sensible way to face several challenges".

Plants and fungi can contribute to finding solutions to the many of the specific challenges that Colombia is facing and can thus become a key driver of social and economic factors. There are many edible species that can mitigate malnutrition, many others that can cure diseases or that can be used as a basis for fibres and materials with which to replace plastic.

In order to envision the magnitude of this trove of resources and possibilities, it should be noted that in one municipality only—Otanche—five species of wild edible mushrooms were catalogued, including *nacumas* (*Favolus tenuiculus*), *tocinas* (*Macrocybe titans*), and *nipurches* (*Schizophyllum commune*), the latter also eaten in communities in Mexico, Guatemala, and Ethiopia. All these species are of considerable nutritional value and can be prepared in a variety of ways. They are usually roasted, stewed with beans and corn or kneaded into meatballs.

Other wild plants can be added to the wide variety of edible mushrooms in this region. They can also potentially be used by communities and the food industry in general. Just in Otanche, the catalogue identified six species of edible wild plants with industrial potential. Such is the case of *palmiche* (*Carludovica palmata*'s fruit), which could serve as a substitute for heart of palm in Colombian cuisine. In addition to gastronomic qualities, this plant also has practical uses: its leaves can be used in the transportation of chickens and hens. *Mafafa* (*Xanthosoma sagittifolium*) is another plant with economic potential. Its thick tuber-like roots can be cooked and fried like cassava. They can be used for human consumption, but can also serve as fodder for farm animals.

Despite the significance of the publication of these two catalogues, most researchers agree on the need to constantly add to them, since it is common for new species of plants and fungi to be identified as different parts of the territory are explored.

Hernando García Martínez, director of the IAVH, is of the opinion that "The current challenge is to connect and link this new knowledge, so that our biodiversity can become a factor of economic development, and add to the gross domestic product. We must connect this knowledge with industrial development and productive chains".

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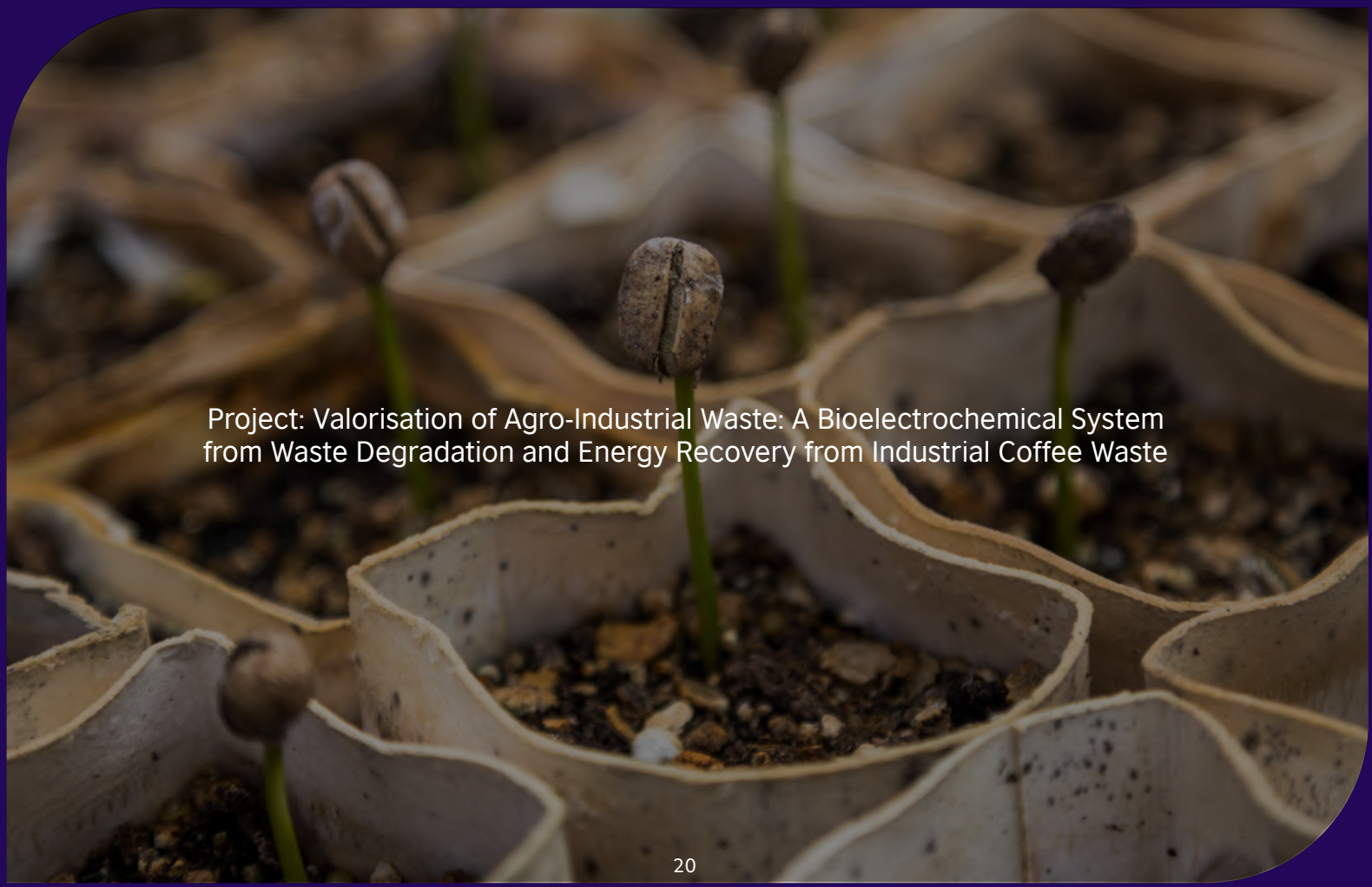
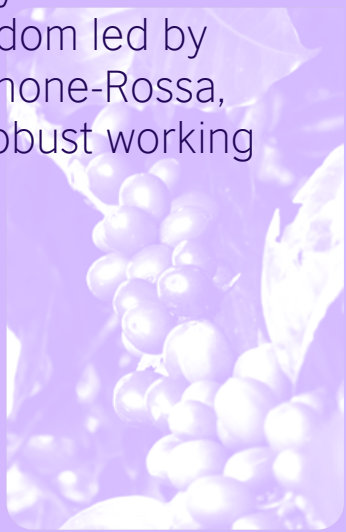
—Hernando García Martínez, director of the IAVH.

Coffee Awakens the World and Might Light it up in the Future



Project: Valorisation of Agro-Industrial Waste: A Bioelectrochemical System from Waste Degradation and Energy Recovery from Industrial Coffee Waste

The team was composed of researchers from the University of Antioquia in Colombia and the University of Surrey in England. The Colombian mission was led by Dr Lina María Agudelo Escobar, an expert in bioprocesses and environmental and agricultural biotechnology. She was accompanied by a team from the United Kingdom led by Dr Claudio Avignone-Rossa, constituting a robust working group.



The coffee bean has provided one of the most widely consumed beverages in the world. Millions of people appreciate its flavour and effects. But we know that all human and mass production has a profound environmental impact and coffee is no exception. Its production requires significant amounts of water and generates organic waste that can have a polluting effect. Colombian and British scientists worked jointly to generate electricity based on coffee waste and imagine a more sustainable world.

Colombia ranks third in coffee production worldwide. It has 564 coffee-producing municipalities with approximately 2 million inhabitants living in them. It is estimated that 94% of these coffee producers use traditional methods that generate large volumes of organic waste that are disposed of in nearby watersheds, generating pollution and disease. Scientists, therefore, used the wastewater from the coffee fruit-bean separation process to feed microbes that generate electricity. This is expected to significantly reduce water pollution, which is eventually returned to the coffee-producing zone ecosystems, while promoting the development of communities by producing clean energy.

Based on a partnership between the British Council and Colciencias (today Minciencias, the Colombian Ministry of Science, Technology, and Innovation), this project—with support from the Researcher Links Programme and the Newton Fund—provides a crosswise contribution to several Sustainable Development Goals of the 2030 Agenda. Specifically, it would have a positive impact on SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), and SDG 12 (Responsible Consumption and Production).

This important piece of research, along with four additional projects, received the 2018 Newton Prize. This award is granted to outstanding proposals and projects executing pioneering and innovative ideas at the forefront of their fields. The 2018 winners were chosen from 22 Latin American finalists.

Both institutions are renowned in the field of research. The University of Antioquia is recognised for its work in bioreactors, microbial cultures, and the use of agro-industrial waste. The University of Surrey, in turn, is an academic centre with expertise in biotechnology, applied microbiology, and sustainable energy.

To produce electricity with wastewater, the researchers designed microbial cells that function as an energy-storage battery. Microbes are placed in the cells, and fed organic coffee waste. In turn, the microbes' metabolic activity produces energy through these battery cells. In theory, each battery cell can generate up to 3 kWh per kilo of organic matter. Its domestic and industrial use potential is thus enormous.

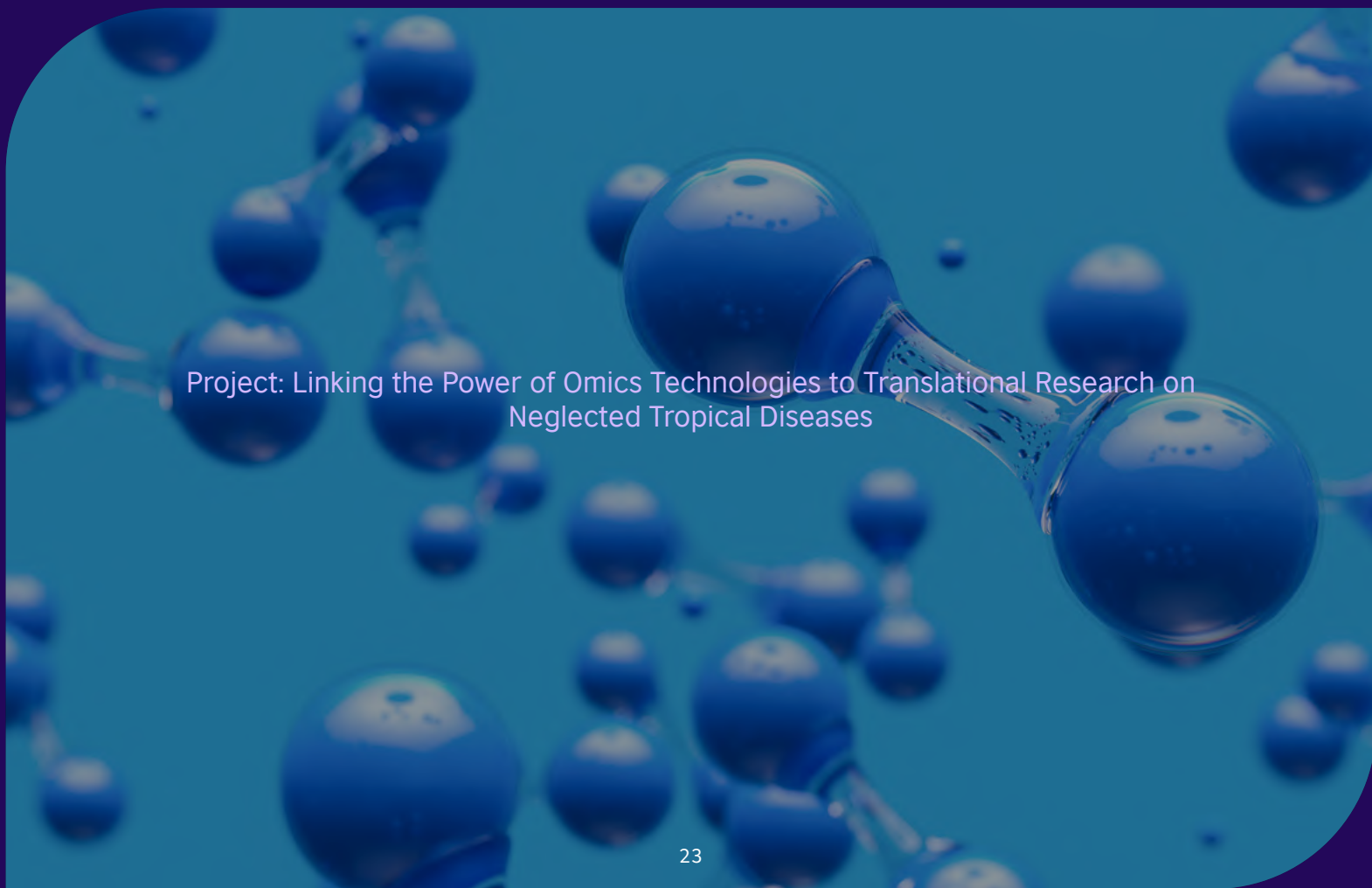
This, however, is only the first step of a more ambitious research that seeks to economically benefit coffee-producing communities. The second step is to develop a small, low-cost device to be tested on coffee-producing family farms. It is an interesting challenge because, if it does work, small-scale coffee-producers could also clean up their wastewater and reuse it, which would mitigate the pressure that currently exists to supply irrigation water for their farms. In addition, on-site power generation could create employment alternatives in areas where jobs are practically non-existent.

The model could also be replicated or serve as a basis for scientists to work shoulder-to-shoulder with large coffee-producing companies, mainly in Europe. The model might even prove to be viable in the rest of the world, since coffee is produced and/or processed extensively across the planet.

Some people are aware of the extreme situation experienced by the planet's ecosystems. The scientific community has understood the emergency and is focussing on building a sustainable world so that we can live in harmony with all species. Nobody wants to renounce the Earth's abundant gifts, like a good cup of coffee, but it is time to enjoy these gifts in the context of sustainable production schemes. Coffee already helps the world wake up every morning, it might perhaps be lighting it up, too.

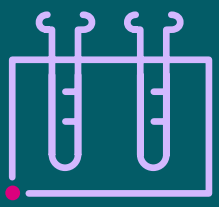
Nobody wants to renounce the Earth's abundant gifts, like a good cup of coffee, but it is time to enjoy these gifts in the context of sustainable production schemes. Coffee already helps the world wake up every morning, it might perhaps be lighting it up, too.

Creating Rapid Tests for Tropical Diseases: A Possible Future for Colombia



Project: Linking the Power of Omics Technologies to Translational Research on Neglected Tropical Diseases

The COVID-19 pandemic placed health at the centre of public debate. This event reminded us of our vulnerability as a species, highlighted institutional flaws and turned our attention to the scientific community's race against time. But beyond the different strains of coronavirus, scientists are also addressing a variety of other diseases, such as those referred to as NTDs (Neglected Tropical Diseases). Experts from the United Kingdom and Colombia seek to forestall some of these diseases afflicting vulnerable populations. For this purpose, experts are being trained to face these conditions with tools derived from research using omics approaches.



In order to meet this challenge, the International Medical Training and Research Centre (CIDEIM by its acronym in Spanish) and the University of Glasgow successfully submitted their project "Linking the Power of Omics Technologies to Translational Research on Neglected Tropical Diseases" to the British Council's Institutional Links Programme on behalf of the Newton Fund.

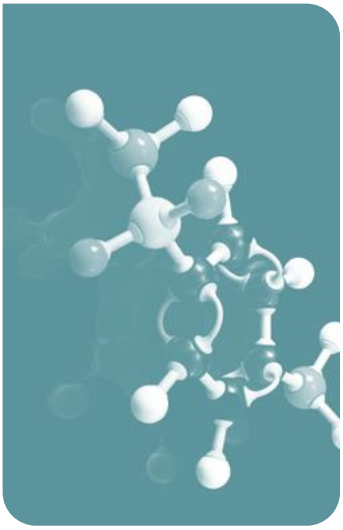
An omics approach consists of simultaneously studying several molecules of an organism, such as its genes, proteins or metabolites, which helps to understand how it works. In the case of NTDs, this approach can be of great help in combatting diseases such as leishmaniasis, Chagas disease, and dengue.

The National Program for the Prevention, Control and Elimination of NTDs was created in Colombia, as part of the 2030 Agenda that establishes in its SDG number 3 a commitment to health and well-being. It should be noted that twelve of the seventeen diseases of this type that have been identified in the world are endemic to Colombia.

The College of Medical, Veterinary, and Life Sciences pertaining to the University of Glasgow conducts its work with an important omics approach and has a diverse portfolio of research in molecular, biochemical, and genetic themes, among others. Hence, the importance of Dr Richard Burchmore, Head of Proteomics at this University, leading the UK team.

On the Colombian side, Dr María Adelaida Gómez coordinated the work of CIDEIM, an important biomedical research institution devoted to mitigating the impact of NTDs. Her valuable contribution was centred on training young Colombian scientists in proteomic and metabolomic analyses.

“It would be wonderful to have rapid tests for these diseases, like we had for COVID, or even treatments that can be carried in your pocket to take in the middle of the jungle without having to travel five hours to get an injection. The greatest power of the omics approach lies in its potential to create simple solutions”.



As in any research, the team faced a wide diversity of challenges. According to Dr Gómez, it was necessary to identify points of convergence and harmonise interests, because although researchers from the United Kingdom “came to learn translational research, i.e., research on humans, to work directly with patient samples, in Colombia we trained in the implementation of basic research with omics sciences in order to improve the treatment of infectious diseases.”

Whereas the United Kingdom has developed a technical language that focusses on the molecular mechanisms and biology of infections, Colombia prioritises treating infected patients in scattered rural areas, such as the jungles on the Pacific Coast. Dr Gómez explained, “Applying this state-of-the-art knowledge to poverty-related diseases is challenging. A technology-oriented future approaches centuries-old diseases in order to find solutions to these health issues”.

It was also necessary to overcome language barriers, since few researchers were bilingual. Therefore, during their stay in the United Kingdom, a number of Colombian scholarship recipients took English classes in Glasgow, which demonstrates the project’s contribution to comprehensive training and investment.

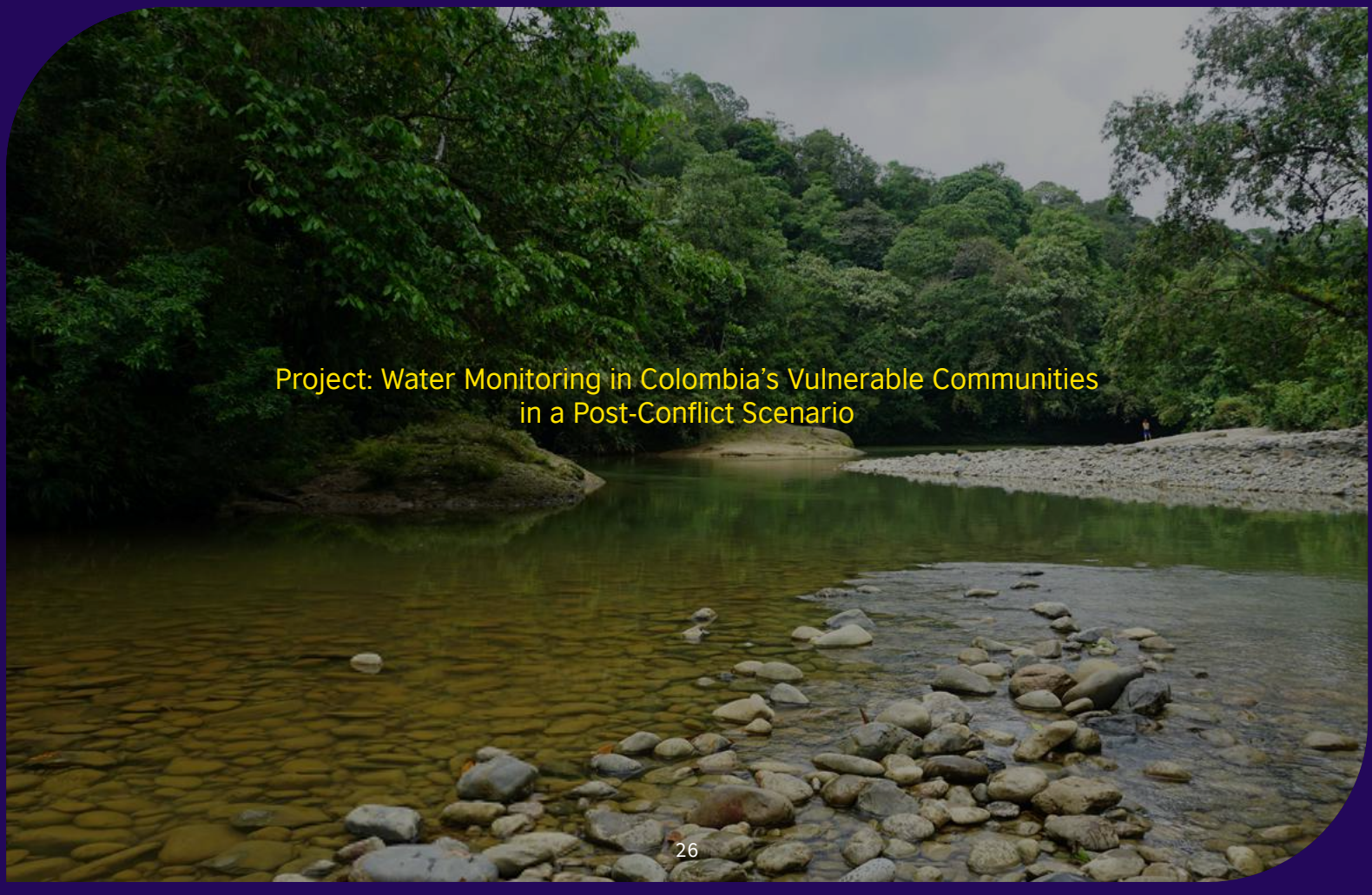
The level of cooperation achieved by scientists from both countries was such that, although the project was mainly developed in 2017, many collaborations are still ongoing and continue to produce positive results to date. The projects grew “exponentially, rather than linearly. It was a phenomenal interaction,” in the words of Dr Gómez.

Given the nature of the project, which focussed on training and institutional interaction, the results were framed within the context of a collaboration between agencies and were measured by the participants’ professional growth and the consolidation of its academic output. There are scholarship grantees who were studying at the University of Glasgow and continued leading their own teams. Such is the case of Carolina Ramírez, who today coordinates the Doctoral Programme in Biomedical Sciences at the University of Rosario or Alejandro Vargas, who currently leads the research unit at CIDEIM.

Due to these results, the researchers in charge are already envisioning a second chapter of this project at a higher level, geared to postdoctoral research moving toward establishing laboratories or improving the infrastructure for research and facing NTDs.

Should this research culminate in applicable technologies, one day under-resourced people may be able to access technologies to diagnose and manage neglected tropical diseases. Dr Gómez concluded that “It would be wonderful to have rapid tests for these diseases, like we had for COVID, or even treatments that can be carried in your pocket to take in the middle of the jungle without having to travel five hours to get an injection. The greatest power of the omics approach lies in its potential to create simple solutions”.

Lead- and Mercury-Free Water for Colombia's Mining Communities



Project: Water Monitoring in Colombia's Vulnerable Communities in a Post-Conflict Scenario

Gold is the mineral that most arouses human ambition and much of its value lies in its scarcity: if all the gold in the world were brought together, it is estimated that it would fill little more than three Olympic swimming pools. In the pursuit of gold, humans have frequently made audacious choices: from the conquest of far-off territories and large-scale migrations, like the famous Gold Rush of Northern California in the nineteenth century, to numerous instances of bank robberies.

Today, gold continues to be sought in increasingly remote places, often with devastating consequences. Illegal gold mining is particularly harmful in Latin American countries such as Colombia, since the release of highly toxic chemicals, such as mercury, causes environmental devastation, deforestation, habitat loss and produces water, air and soil pollution. These activities affect local communities, contributing to the forced displacement of populations, corruption, human rights violations and health problems.

In Colombia, there are 233 municipalities with mining activity, which has led to the contamination of 19 rivers. It is estimated that 69% of mining in Colombia is illegal, which hinders the implementation of sustainable policies to mitigate water deterioration. Remote areas such as the Amazon are among the most affected. This is partly due to the fact that it is difficult to access these areas in order to conduct management and control activities.

Therefore, a group of experts developed a device to measure heavy metal pollution of water on site. From the onset, the intention was for local communities to gain access to this device in order for them to become empowered and help them prevent the negative effects of mining pollution on water. This would also protect their health, since most villagers bathe, fish, and irrigate their crops with water containing high concentrations of metals such as cadmium, mercury, and lead.

The need for drinking water in Colombia's mining communities is also framed within a post-conflict scenario, in that many people who once participated in local armed movements are now reintegrating into their communities in order to have active economic and social participation with not only the benefits but also the demand for needs and services that this implies.

This project is a result of a partnership between the British Council and Colciencias (now Minciencias) and is backed by the Colombia BIO initiative. It is supported by the Newton Fund through the Institutional Links Programme and is aimed at contributing to three Sustainable Development Goals outlined in the 2030 Agenda: SDG 3 (Good Health and Well-being), SDG 6 (Clean Water and Sanitation) and SDG 14 (Life below Water).

Meeting the challenge and developing a truly functional device required a multidisciplinary team led by Professor Mirella Di Lorenzo from the University of Bath. Di Lorenzo is an expert in water quality analysis systems and sensing technologies used to monitor heavy metals.

The Colombian team was led by Dr Alba Ávila, from the University of the Andes, who contributed her knowledge in micromanufacturing and sensor development, particularly in detection system engineering and technical education for rural communities.

The device created by these researchers, which is no larger than a tool kit, contains a low-cost sensor to which a small sample of water is added in order to detect the presence of heavy metals. It can also monitor physical-chemical parameters, such as pH, conductivity, dissolved oxygen, and temperature, which gives it added value and allows scientists to feed the data it gathers into a larger database with information that can potentially mitigate the effects of mining activity on water.

The database is available on the internet, which enables the inhabitants of mining areas to have easy access to data that has a direct impact on their health. In addition to preventing the consumption of contaminated water, the idea behind this system is to provide communities with robust data that can support their daily needs, as well as any potential claims regarding water quality made to authorities.

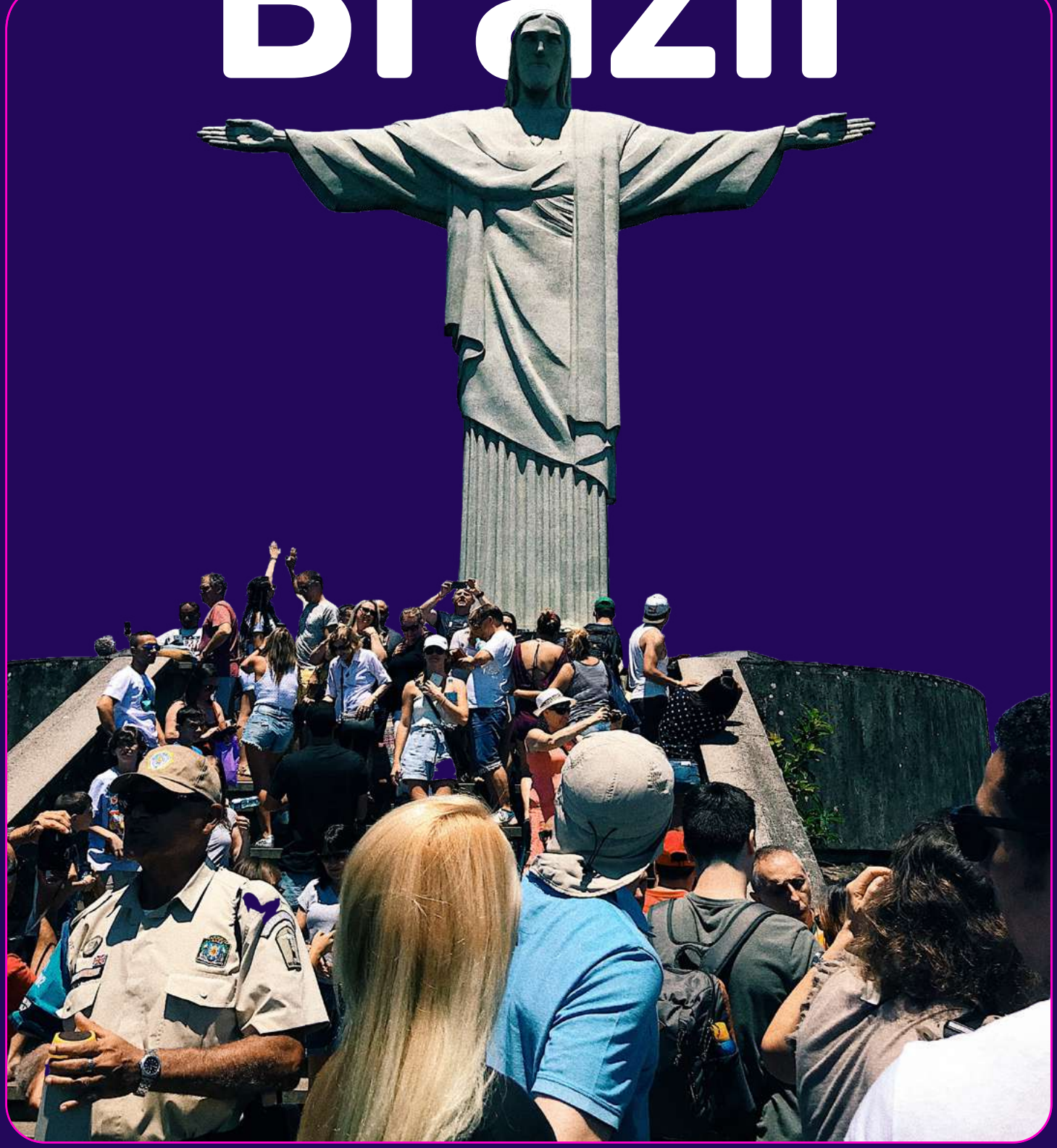
The project involved the inhabitants of the village of Santa Sofía, in the southern tip of Colombia, a community that relies on the Amazon River for its subsistence and that in recent years has suffered from chemical and heavy metal contamination of its waters. In Santa Sofía, training the locals in the use of the tool enabled researchers to test, adjust, and learn about the benefits of the device in a real context. The training also allowed them to collect valuable feedback from the local population.

For researchers Di Lorenzo and Ávila, the current challenge is to perfect the device so that it is even smaller and more intuitive in its use. Thus, anyone in the community would be able to use it. According to Professor Di Lorenzo, “the only way to prevent the consumption of contaminated water is to give the tool to communities to check if the water they use every day is drinkable or not”.

The future of the device is encouraging not only for Colombia, but for the whole world, especially those areas in which mining represents a health problem. It can be used by communities, educational institutions, non-governmental organisations, and, of course, the authorities that regulate mining activities in each country, in such a way that strategies can be designed so that companies that enrich themselves with these resources mitigate and compensate for the damages they cause.

According to Professor Di Lorenzo, “the only way to prevent the consumption of contaminated water is to give the tool to communities to check if the water they use every day is drinkable or not”.

Brazil




Av. Paulista
Bela Vista
V. Mariana
50
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Our Work in Brazil

TOTAL JOINT INVESTMENT

£17 MILLION

TOTAL NUMBER OF PROJECTS

117

PROGRAMMES IMPLEMENTED

RESEARCHER LINKS WORKSHOPS

INSTITUTIONAL SKILLS

INSTITUTIONAL LINKS

PROFESSIONAL DEVELOPMENT AND ENGAGEMENT

RESEARCHER CONNECT

NEWTON FUND IMPACT SCHEME

PARTNERS

FAPESP

CONFAP

CNPQ

FAS

FGV

FIOCRUZ

SEBRAE

NUMBER OF UK INSTITUTIONS

38

NUMBER OF BRAZILIAN INSTITUTIONS

57

Our Work in Brazil

Brazil, the largest and most populated country in South America, has emerged over the past decade as the largest economy in Latin America. Its northern region is home to the Amazon, the most biodiverse rainforest globally, and the world's most abundant river. The central-west and southeast regions contain areas of immense ecological significance, including the Greater Pantanal, along with two major cities, São Paulo and Rio de Janeiro. Brazil is a culturally rich country, marked by powerful syncretisms that have taken place and continue to occur throughout its vast territory, which is akin to a continent in size. The country's diverse ethnic roots, including Tupi-Guarani, Amazonian, African, European, Asian, Arab, and others, contribute to making Brazil one of the most culturally diverse lands on earth.

Furthermore, Brazil is one of the countries with the greatest levels of economic inequality. This is reflected not only in the enormous differences in income levels, but also in the disparate economic development of the country's provinces. While states such as São Paulo and Rio de Janeiro concentrate economic activity and educational institutions, smaller ones such as Piauí or Acre face a different reality. Brazil also experiences challenges in areas such as education, accelerated loss of biodiversity, violence, and social division.

A similar inequality occurs within the field of development and scientific research. Although Brazil is the Latin American country that invests most in this area, scientific development is concentrated in a handful of states. This situation became aggravated after the 2014 economic recession that caused a succession of political and institutional crises. As a result of a process of budget cuts, the share of GDP allocated to research and development fell sharply in 2019.

The Newton Fund, which began operating in Brazil in 2014, capitalized on what despite its ups and downs remains a vigorous ecosystem in science and technology with considerable talent and leading institutions. Together with the Brazilian government, the Newton Fund established the following priority areas: agriculture, the environment, and earth sciences; capacity-building and partnerships; health and life sciences; social inequities and resilience; as well as innovation.

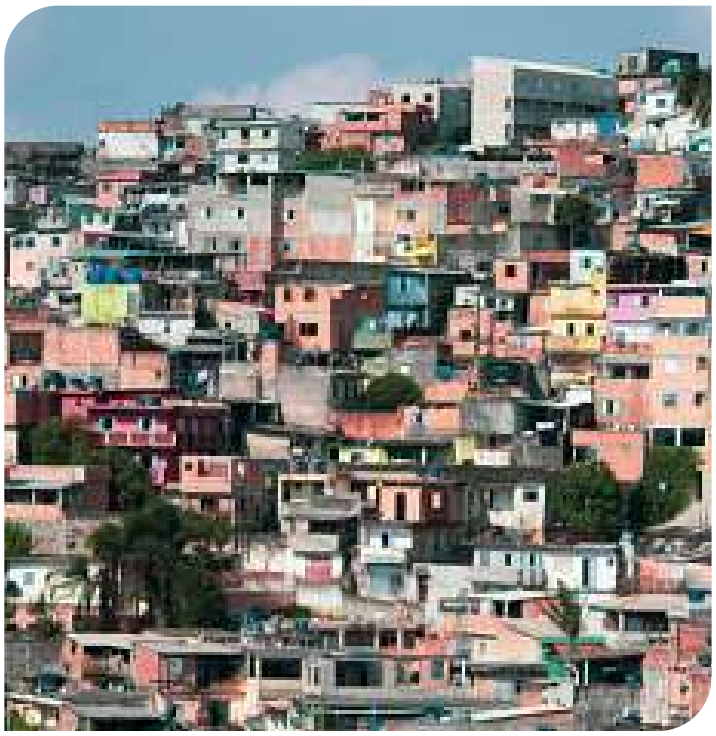
In its capacity as implementing partner, the British Council together with its local partners made use of a budget exceeding £17 million, and applied it to develop the Institutional Links, Institutional Skills, Impact Scheme, Researcher Connect, Researcher Links, and Professional Development and Engagement Programmes. According to Diana Daste, Director of Education, English, and the Arts at the British Council-Brazil, a special emphasis was placed on the development of the "People" and "Translation" linchpins. The Researcher Links Programme was of great importance for the construction of research capacities and resources, which is one of Brazil's priorities. Programs such as the Master's Fellowship for Underrepresented Groups in Science and Researcher Connect enabled the development of partnerships to attract groups that have been historically excluded by science (for instance, women) and strengthen academic writing in English. Other important outcomes of the work facilitated by the British Council include the consolidation of Zika virus research groups and clinics related to violence in times of democracy.

The implementation of the Newton Fund in Brazil was characterised by the large number of local partners with whom the British Council had the opportunity to work. As in the rest of the region, these partners offered, in addition to their knowledge, a matching fund for project financing. These partners include the Research Support Foundation of the State of São Paulo (FAPESP), the National Council of State Funds for Research Support (CONFAP), the National Council for Scientific and Technological Development (CNPq), the Fundação Amazônia Sustentável (FAS), the Fundação Getulio Vargas (FGV), the Fundação Oswaldo Cruz (FIOCRUZ), the Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (SEBRAE), among others.

Vera Oliveira, Director of Education – Americas at the British Council stated that although Brazil and the United Kingdom already had a lengthy history of scientific cooperation, the Newton Fund deepened partnerships between institutions in both countries. Furthermore, collaborations were established with agencies from different regions of Brazil. For instance, the British Council partnered with the Research Promotion Foundation of Amapá state as part of the Professional Development & Engagement Programme and with the Research Promotion Foundation of São Paulo under the Institutional Links Programme. These partnerships were feasible due to varying levels of investment that enabled the formation of projects with partners having diverse technical and financial capabilities. As a result, the United Kingdom emerged as Brazil's second-largest partner in scientific publications, surpassed only by the United States of America.[8]

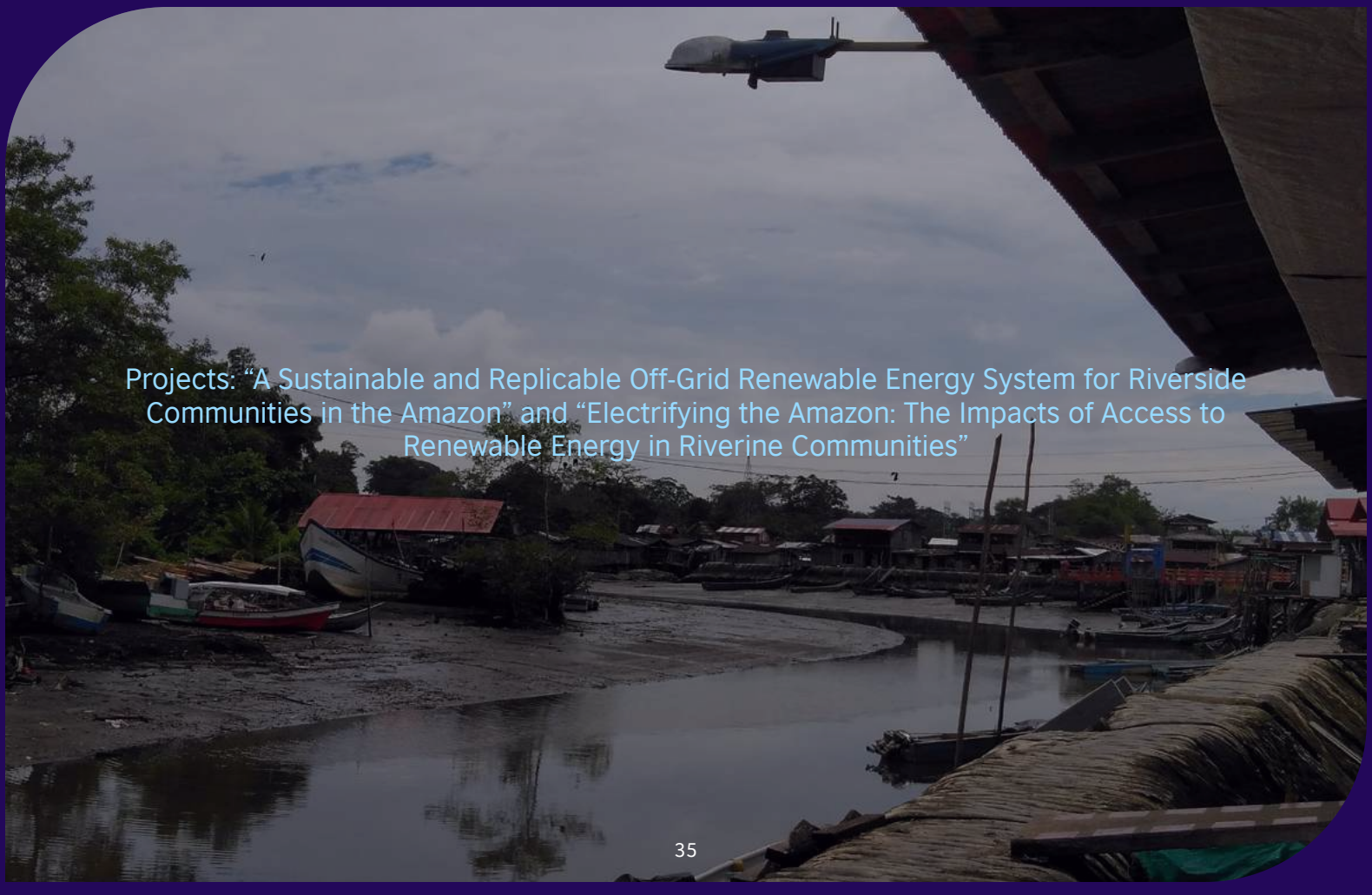
An important element in any project seeking to influence the Brazilian reality is to take into account who it is addressing. For research professionals implementing science, technology, and innovation projects, challenges include project long-term sustainability, as well as setting up structures and strategies for better understanding and communicating project impacts and formulating clear metrics. It is also important that the programmes be flexible, co-created, and inclusive, as these characteristics enable better results. According to Daste, projects must be "applicable, replicable, and scalable" in order to have a broad impact beyond the academic circle. Another element worth highlighting is the need to continue to search for ways to decentralize scientific development, thus making it possible to go beyond the well-trodden paths to reach other corners of this vast country.

8 Veiga Mariana, Diego Arruda, Maíra Brito, and Thaissa Avena. 2020. "The Newton Fund in Brazil 2014-2020".




WONKI

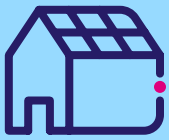
Electrifying the Amazon



Projects: “A Sustainable and Replicable Off-Grid Renewable Energy System for Riverside Communities in the Amazon” and “Electrifying the Amazon: The Impacts of Access to Renewable Energy in Riverine Communities”

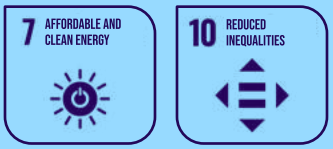
Living on a river bank is no easy feat, and it becomes even more complicated when the river happens to be the largest in the world. In Brazil, along the Amazon River, communities in the state of Amazonas—the largest province in all South America—face particularly difficult challenges due to their isolation by dense jungle. Meeting basic energy needs is a constant struggle for these communities, who rely on limited resources.

A research project entitled "A Sustainable and Replicable Off-Grid Renewable Energy System for Riverside Communities in the Amazon" was conducted through the Institutional Links Programme to address this situation affecting 2,261 communities. Its first objective was to design, pilot, and monitor socially viable, environmentally-friendly, and cost-effective energy solutions. After the findings of an initial research, two photovoltaic solar systems were set up to produce electricity. Their goal was to replace the commonly used diesel generators in the region, which cause negative environmental impacts that are further exacerbated by the isolation of many communities that can only be reached by boat.



This research project, led by Alessandro Trinidade from the Federal University of the Amazon (UFAM) and Elena Gaura from Coventry University, was carried out with support from the Newton Fund through a partnership between the British Council and the Amazonas Sustainability Foundation (Fundação Amazônia Sustentável, or FAS by its acronym in Portuguese).

At the time of this research, conducted between April 2017 and March 2019 in the indigenous community of Nova Esperança, the villagers only had a broken down diesel generator. The project provided electric power to six of the 32 households in the village. Considering an average of four people per household, the project had a direct impact on 24 people. As such it contributed to the 2030 Agenda for Sustainable Development SDG 7 (Affordable and Clean Energy) and SDG 10 (Reduced Inequalities).



Although the energy solution is far from being an innovation—photovoltaic systems that store energy in batteries have been on the market for years—its implementation had a direct impact on the village's habits and energy consumption. For example, half of the individuals studied used electricity to increase their income: one family bought a refrigerator and started selling ice cream (a relief in a place with humidity as intense as that of the Amazon). Another individual, a craftsman, was able to access a lightsource which allowed him to work on his necklaces late into the night. The same happened with a third individual, who was able to produce a larger number of wooden sculptures.

One of the study's findings—monitored by a remote system at Coventry University from a flash memory card, since communities did not have telephone wiring, or cell phone or internet coverage—confirmed the researchers' intuition that energy consumption increases when it is available 24 hours a day. In addition, findings confirmed the hypothesis that use of electricity is directly linked to greater well-being and better living conditions.

The data produced by the research will assist in formulating strategies to improve living conditions in this community, as well as in designing techniques to set up photovoltaic solar energy systems in other communities. It was demonstrated that this system, based on a sustainable model, reduces greenhouse gas emissions, since energy demand would have otherwise been met through diesel generators.

The end result is a research study that examines data on the demographics, energy requirements, aspirations, and well-being of fifteen riverside communities in the Amazon region. This project can be replicated elsewhere, as demonstrated by the implementation of a second project derived from it in 2019, also supported by the Newton Fund together with the London School of Economics and Political Science (LSE) and the Amazonas State University (UEA by its acronym in Portuguese), aimed at equipping a common area in another community with electric power.

In a second stage, and as part of the Newton Fund Impact Scheme, a research project entitled "Electrifying the Amazon: The Impacts of Access to Renewable Energy in Riverine Communities" was carried out under the leadership of

Dr Charles Palmer from the London School of Economics and Political Science (LSE) together with Professor Helder Cruz Male, faculty member of UFAM. This project was based on the earlier project "A Sustainable, Replicable Off-Grid Renewable Energy System for Riverside Communities in the Amazon."

Both projects were to be evaluated using methodological tools developed in a third project supported by the Newton Fund entitled "Participatory Approaches to Natural Resource Conservation in the Brazilian Amazon," which consisted of corroborating the participatory methods that support the network of sixteen reserves covering 16 million hectares inhabited by 40,000 riverside inhabitants in 470 communities in the state of Amazonas.

"Participatory Approaches..." was managed by FAS, charged with promoting environmental conservation through sustainable development. Since 2007, FAS has coordinated income-generating projects, as well as education and health infrastructure projects, in addition to a payment system for environmental services, which impacted the performance of the Bolsa Floresta Programme (PBF) led by FAS. The PBF essentially focusses on promoting forest conservation through its sustainable use by providing direct financial advice and indirect support to people living in protected areas in Brazil in exchange for their participation in conservation measures.

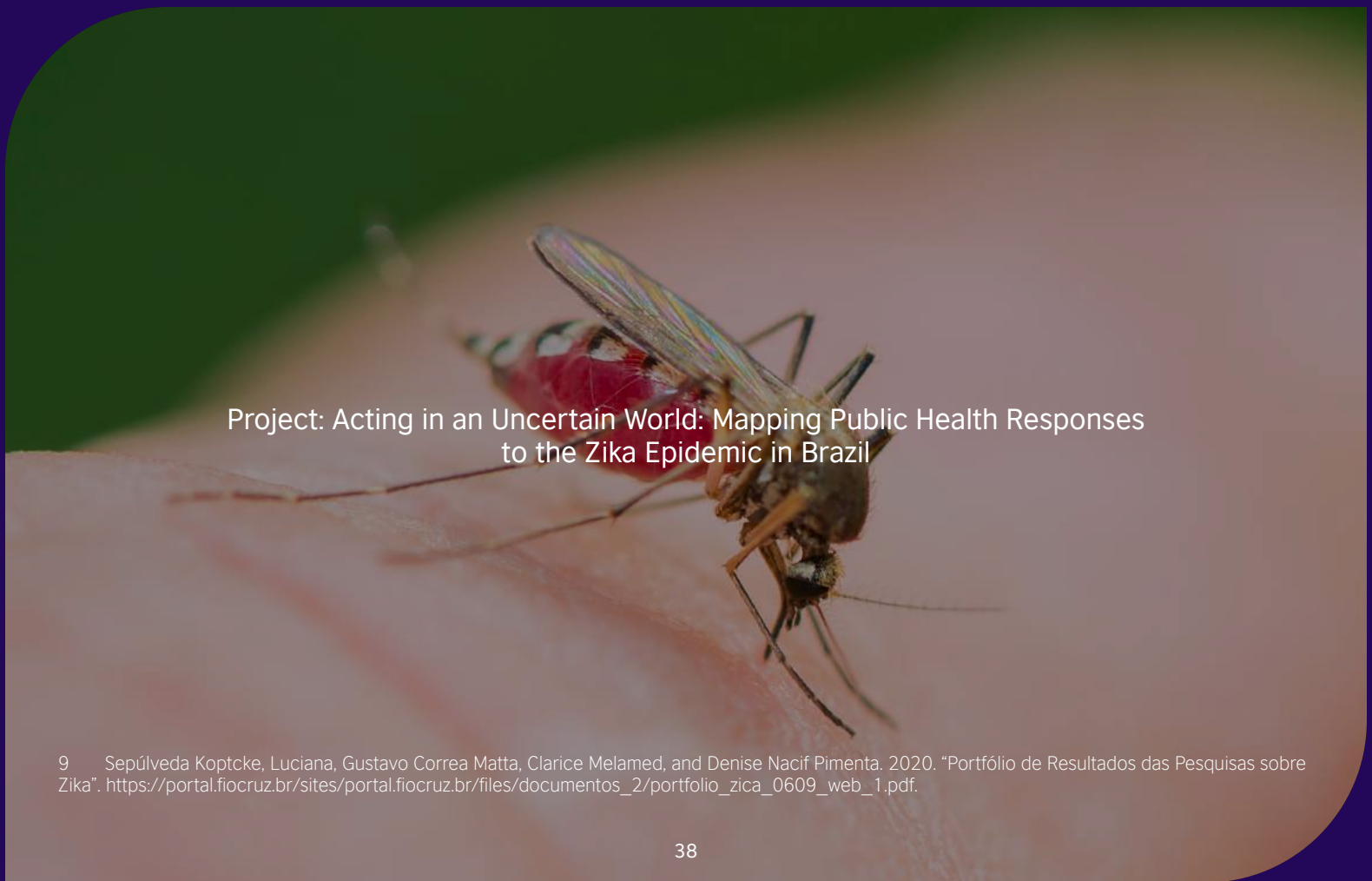
In order to reach the PBF's objectives, this research developed alternative livelihoods and sources of income, such as the production of handicrafts, a skill developed mainly by women, aimed at reducing environmental pressure on rainforests. Expanding access to and improving the quality of the electric power supply is one possible way to increase the scope and scale of these activities to improve people's income. This fortifies women's role in the local economy, encouraging economic growth in Amazonian communities with an inclusive perspective, on the one hand, and strengthening participation in environmental governance, on the other.

Specific achievements include the design of a preliminary methodological strategy for data collection and analysis, grouping and analysing bibliographic references on the participatory management of natural resources, as well as payment for ecosystem services aimed at contributing to the discussion and debate, envisaging the publication of a peer-reviewed academic paper, as well as developing a more sophisticated student selection and recruitment process to form the project's research team.

A highlight of this research has been the synergy and interaction between the research teams from the UK and Brazil, which holds the promise of continuing collaboration beyond the limits of financing, which can be reinforced, as the project continues with support from other partners and funding sources.

"Participatory Approaches..." was managed by FAS, charged with promoting environmental conservation through sustainable development.

The Zika Epidemic in Brazil: The Enemy Is Not Only The Mosquito, But Also Disinformation[9]



Project: Acting in an Uncertain World: Mapping Public Health Responses to the Zika Epidemic in Brazil

9 Sepúlveda Koptcke, Luciana, Gustavo Correa Matta, Clarice Melamed, and Denise Nacif Pimenta. 2020. "Portfólio de Resultados das Pesquisas sobre Zika". https://portal.fiocruz.br/sites/portal.fiocruz.br/files/documentos_2/portfolio_zica_0609_web_1.pdf.

Night-stalking animals such as jaguars, lions, bears, and wolves have long instilled fear in human beings, becoming the subjects of many tales and legends. However, it is often the tiniest creatures that pose the greatest threat. Insects such as ticks, fleas, and mosquitoes are capable of transmitting viruses and bacteria, making them dangerous vectors that can wreak havoc on our health and even lead to death. The *Aedes* mosquito, for instance, is responsible for transmitting diseases like dengue, yellow fever, chikungunya, and zika.

The Zika virus epidemic that struck Brazil in 2015 not only impacted the health of thousands of people, but also highlighted a disconnect between political rhetoric and scientific communication about the disease and its consequences. This increased uncertainty among the local population and generated multiple narratives about the epidemic.

As a result, a collaborative research project was undertaken between the Sérgio Arouca National School of Public Health in Río de Janeiro (ENSP/Fiocruz by its acronym in Portuguese) and Oxford University. This research sought to map the scientific and political discourses regarding the uncertainties emerging from the Congenital Zika Syndrome (CZS) during the 2015-2016 epidemic. Pregnant women infected with Zika run the risk of giving birth to babies with CZS, which is linked with microcephaly and other congenital conditions.

Given the nature of this research, its results contribute towards the Sustainable Development Goals. The treatment for CZS works specifically towards attaining gender equality (SDG 5), good health and well-being (SDG 3), and reduced inequalities (SDG 10).

Supported by the British Council's Institutional Links Programme, the research aimed to explore the complex interplay between science and politics and shed light on the narratives that emerged during the Zika epidemic, which caused confusion and bewilderment. The research identified three sensitive areas regarding the treatment of the epidemic:

1. Diagnosis, i.e., the communication of information about the disease.
2. Overall health, i.e., understanding the narratives referring to the disease within both the local and global context.
3. Gender. The research identified that the policies focussed on promoting individual actions and, therefore, the responsibility was often attributed to the group that was most affected by the disease: women.

Insects such as ticks, fleas, and mosquitoes are capable of transmitting viruses and bacteria, making them dangerous vectors that can wreak havoc on our health and even lead to death.

An innovative aspect of this research was its integration of social science and biomedical perspectives, with a particular emphasis on entomology, resulting in novel and comprehensive findings.

Due to the study's interdisciplinary approach, it put forth a social response that could be utilized in the face of future health emergencies or epidemics. Thus, the research became a tangible tool for collective action. By actively involving the social sciences, the study shed light on the pre-existing conditions of diseases such as dengue, as well as the structural instabilities that render societies vulnerable to epidemics. As a result, the study's insights can inform more effective responses to future health crises.

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Other core aspects identified by the research team was the lack of recognition of the role played by women in decision-making related to controlling the spread of the *Aedes* mosquito, and the significance of expanding women's sexual and reproductive rights, enabling them to be empowered in the face of a virus that poses a threat to the health of both women and children.

The expert team also identified gaps in the information provided to mothers: although the health authorities recommended avoiding pregnancy in general and protecting against mosquito bites, these recommendations were not accompanied by clear and specific information about reproductive health or self-care. The researchers recommended maintaining a focus on issues surrounding access to information, which are often influenced by economic and social factors, as women in impoverished situations are the most adversely affected.

The Brazilian team was led by Dr Gustavo Corrêa Matta from the Oswaldo Cruz Foundation, as general coordinator, and Carolina de Oliveira Nogueira, as adjunct coordinator. The British counterpart was led by Dr Javier Lezaum. The team as a whole demonstrated, with clear results, that social sciences are an indispensable tool to face an epidemic in each of the scientific, public policy, or social stages of response, since social sciences offer a broader perspective of both the research protocols and the links between politics and scientific practice.

Building a unified front to confront the devastation wrought by the tiny yet perilous *Aedes* mosquito is imperative. Only through such collective efforts can we prepare ourselves to confront potential health emergencies that may arise in the future. It is evident that mosquitoes will persist, and it is only a matter of time before another epidemic emerges, be it Zika or another disease.

In Unity There Is Strength: Coastal Biodiversity and Public Policies on the São Paulo Coast

Project: Coastal Biodiversity and Public Policies: Methodologies and Actions to Integrate Stakeholders

This novel research established connections between science, public policy, and sustainable development

The port of Santos, the largest in South America, is located on the coast of the state of São Paulo. It is a key point for international trade, exporting goods to the most diverse parts of the planet: beef for the Netherlands, soybeans to be served in restaurants in the United States, and iron for Chinese industry. Beyond its commercial importance, however, this coastal region is home to a number of ecosystems that provide invaluable environmental services; for example, mangroves that play a key role in preventing erosion and conserving habitat, or the many sandy beaches enjoyed by visitors from all over Brazil and sustaining thousands of tourism-related jobs.

In order to preserve coastal biodiversity, this project aimed to integrate researchers, political stakeholders, and local communities in order to develop a socially-relevant innovative public policy programme, from a crosscutting and interdisciplinary perspective, using the jagged coasts, sandy beaches, and mangrove biodiversity of the municipalities of Santos and Guarujá in the state of São Paulo as a model system that takes into account the socio-economic and cultural importance of the area. The project received the support of the British Council's Institutional Links Programme and lasted 36 months.

The research was led by Ronaldo Christofoletti, from the Federal University of São Paulo (UNIFESP), and Stuart Jenkins, from the School of Ocean Sciences at Bangor University in North Wales, who in 2014 had already collaborated together in a previous project supported by the Researcher Links Workshops Programme.

This novel research established connections between science, public policy, and sustainable development, utilizing shared foundational knowledge to expand skill sets and create documents, actions, and public policies that focused on promoting the well-being of the ocean and its culture. It should be noted that the Santos Ministry of the Environment and the Guarujá Ministry of the Environment were also collaborators in the project.

The results of this joint effort include the development of a citizen science programme to monitor coastal biodiversity aimed at strengthening the integration between social stakeholders and the environment. In this programme, entitled Marea de Ciência (A Tide of Science), Professor Stuart Jenkins and other researchers from the United Kingdom provided advice and training, sharing their experience in developing citizen science learning in the country where they are working. Based on this exchange, the Brazilian research team gained solid foundations to develop a model adapted to the local reality.

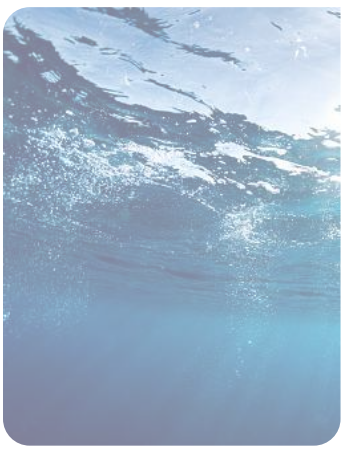
This partnership led to collaboration opportunities with the Santos authorities and the formulation of public policies that were based on shared interests, which further strengthened ties between academia and the government. One significant outcome of this work was the UNESCO recognition of Santos as the first city in the world to enact a law promoting the inclusion of ocean culture in the school curriculum. This law led to the establishment of the "Observatory of the Interface between Science and Sustainable Development Public Policies," which served as a platform for researchers, public officials, and civil society to engage in dialogue. These efforts directly contributed to Sustainable Development Goals 14 (Life below Water) and 17 (Partnerships to Achieve the Goals).

The success of the research project extended beyond the regional scale and gained national and international visibility. As ocean conservation became a highly pressing issue globally, the project increased in relevance. This was further emphasized by the UN's declaration of 2021-2030 as the "Decade of Ocean Science for Sustainable Development." As a result, the research team was invited to share practices and knowledge at various events in Brazil and overseas.

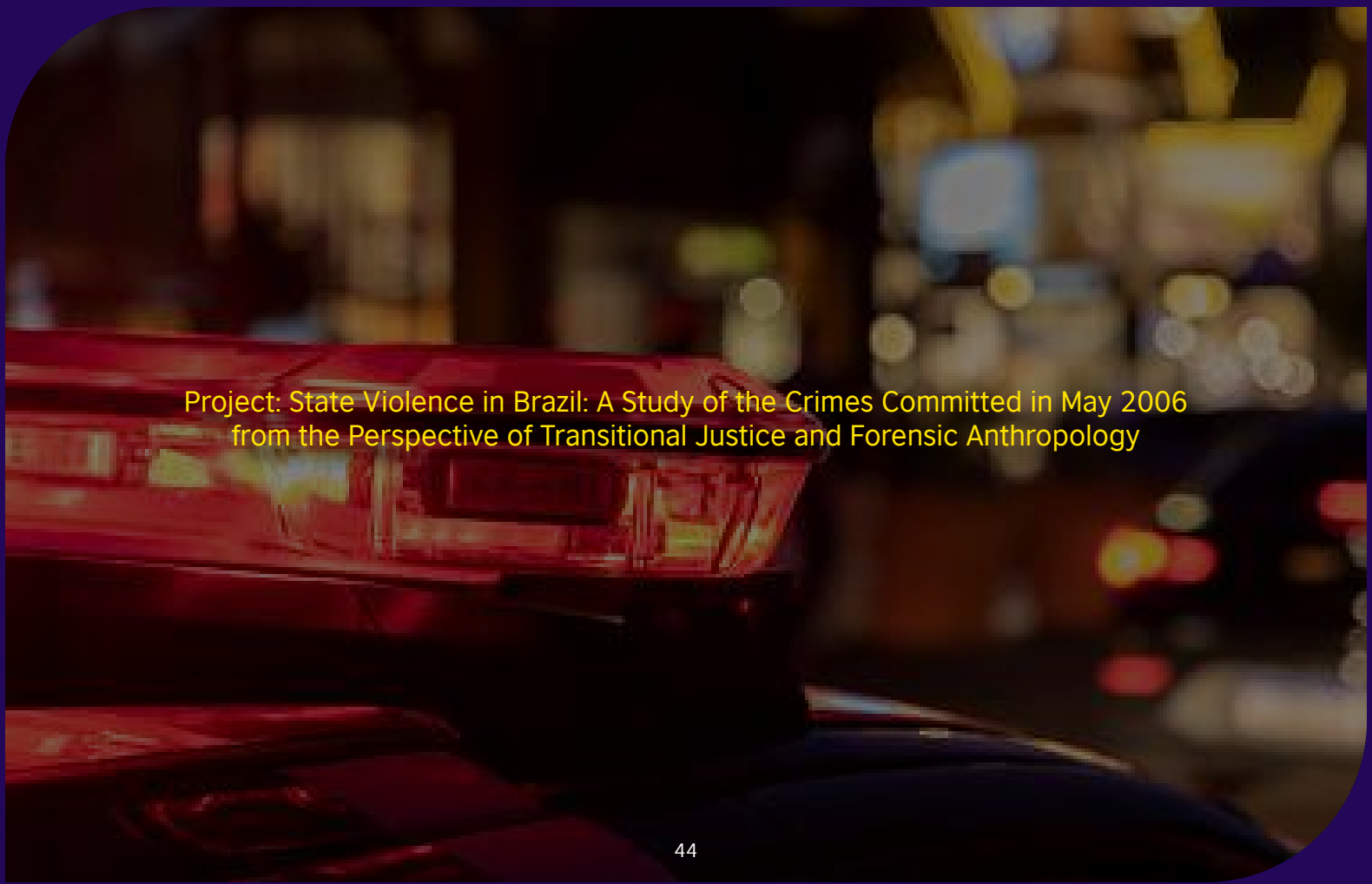
In addition, the team created other organisations and products, such as the Brazil Blue Schools Network, where students develop ocean sustainability projects. This network currently engages 41 schools, 8,600 students, and 250 teachers, sharing information about how each institution interacts with ocean culture.

Finally, both the interface between science and public policies and the methodology to create participatory public policies were incorporated into Brazil's National Plan for the Decade of Ocean Science.

This network currently engages 41 schools, 8,600 students, and 250 teachers, sharing information about how each institution interacts with ocean culture.



Using Forensic Anthropology to Comprehend State Crimes



Project: State Violence in Brazil: A Study of the Crimes Committed in May 2006 from the Perspective of Transitional Justice and Forensic Anthropology

State crime has been a well-documented occurrence throughout the history of Latin America. The aim of this project was to strengthen the use of forensic anthropology in Brazil, specifically to investigate 60 homicides that occurred between May 12 and 20, 2006 in the Baixada Santista metropolitan region situated on the coast of the state of São Paulo. In spite of testimonies from the relatives of victims and human rights groups, these 60 crimes affecting the civilian population were never solved, and the main suspects—agents of the State—were never convicted.

The research project was a collaborative effort between the Centre for Forensic Anthropology and Archaeology at the Federal University of São Paulo (CAAF-UNIFESP) and the Latin American Centre at Oxford University's School of Interdisciplinary Area Studies. This project was supported by the British Council's 2015 Institutional Links Programme and the Brazilian Federal Government's National Human Rights Ministry (SDH). Through a human rights and forensic anthropology lens, the study aimed to analyse the persistence of violence perpetrated by State agents during the 1960s and 1970s—a period of dictatorship terror in Brazil—and its impact on contemporary society. Of particular interest was the ongoing presence of such violence in areas inhabited by Black Brazilians, who have historically and systematically faced social marginalisation.

The research project was crafted as an interdisciplinary initiative that involved collaborative efforts and social mobilization. Its overarching goal was to establish a novel perspective on these crimes. The project contributed to Sustainable Development Goal 16 (Peace, Justice, and Strong Institutions).

The research group was led in Brazil by Dr Javier Amadeo, from the Federal University of São Paulo; on the British side, by Dr Leigh A. Payne, from the Latin American Centre.

One of the project's notable achievements was the establishment of a set of protocols that could aid the State in enhancing Brazilian democracy. These protocols include a method for identifying forcibly disappeared persons by investigating possible signs of execution or torture, as well as discussions on the most effective strategies for presenting evidence that could lead to the conviction of officials responsible for human rights violations. Additionally, the research team conducted various studies, seminars, and outreach efforts aimed at empowering communities that have historically been victimized by State agents since the dictatorship era. These efforts particularly focused on areas on the periphery of São Paulo, Rio de Janeiro, and Baixada Santista.

Another objective was to link with human rights collectives and social movements, specifically with the "Mothers of May" movement, which emerged in 2006 after the murders, in order to contribute to political claims, as well as to support and follow up the legal processes to obtain the arrest of the agents involved in the crimes.

However, it is necessary to note a core difference identified in the *Final Report*, which points out that "there were two categories of fatal victims: State agents and civilians. In this regard, it is striking that crimes against civilians have not been investigated as stipulated by law, and that it was often up to the family members to investigate the cases. In contrast, in those cases involving State agents, who were also victims of this conflict, there was further investigation, including the conviction of the culprits. We observe, therefore, that the State acts differently regarding its agents in relation to civilians and, as in the present case, regarding people with a disadvantaged economic and social situation".

The results of the investigation were presented to various Brazilian authorities, including the Attorney General's Office, in order to raise awareness among the country's institutions of the violence committed by the police forces, but, above all, the intention was to implement innovative policies aimed at eradicating such violent and nefarious practices. In addition, the document included the victims' family members as part of the investigators and proactive agents, rather than their remaining only a subject of study. This led to the empowerment of families, who, endowed with legal knowledge about State violence, made use of tools to confront the State and demand reparations and justice.

As well as influencing the project's formulation and development, the CAAF's collaboration with the British Council was central to creating an international network of researchers, professors, and professionals linked to human rights organisations in the UK, thus paving the way for future collaborations.

A final output of the research project was the publication of the book *Violência de Estado na América Latina: Direitos Humanos, Justiça de Transição e Antropologia Forense* [which could be translated as *State Violence in Latin America: Human Rights, Transitional Justice, and Forensic Anthropology*] by the Federal University of São Paulo.

The State acts differently regarding its agents in relation to civilians and, as in the present case, regarding people with a disadvantaged economic and social situation.

Mexico

Our work in Mexico

TOTAL JOINT INVESTMENT

£8.3 MILLONES

TOTAL NUMBER OF PROJECTS

97

PROGRAMMES IMPLEMENTED

- RESEARCHER LINKS WORKSHOPS
- RESEARCHER LINKS TRAVEL GRANTS
- INSTITUTIONAL LINKS
- PROFESSIONAL DEVELOPMENT AND ENGAGEMENT
- RESEARCHER CONNECT
- NEWTON FUND IMPACT SCHEME

PARTNERS

- CONACYT
- REDNACECYT
- SENER
- SECTEI
- CITNOVA
- COPOCYT
- INAPI
- INADEM
- BAJAINNOVA
- IMSS
- ACADEMIA MEXICANA DE CIENCIAS
- CONCYTEP

NUMBER OF UK INSTITUTIONS

64

NUMBER OF MEXICAN INSTITUTIONS

56

Our work in Mexico

With a population of over 130 million inhabitants, Mexico is the second-most populous country in Latin America. Additionally, it boasts the second-largest economy in the region. It is a complex territory in which dozens of languages are spoken and a diversity of indigenous groups reside, including the Rarámuri in Chihuahua, the Zapotecs in Oaxaca, and the Tojolabales in Chiapas. Geographically composed of mountain ranges, deserts, and grasslands, Mexico is also the cradle of areas of paramount importance for global biodiversity, such as the Mayan Jungle and the Sea of Cortés. This country is home to Mexico City, the largest capital in North America, and to thriving and innovative cities such as Guadalajara and Monterrey, as well as Cancún, one of the most visited tourist destinations in the world.

Mexico's largest trading partners are the United States and Canada. The three countries have signed the Agreement between Mexico, the United States and Canada (T-MEC by its acronym in Spanish). However, in recent years the scientific, technical, cultural, and educational exchange between the United Kingdom and Mexico has been increasing.

In order to better react to complex challenges, Mexico has created institutions devoted to science, technological development and research. In recent years, these institutions have made efforts to increase their internationalisation and global cooperation, establishing agreements such as that signed between the National Council of Science and Technology (Conacyt) and the British Council as an implementing partner of the Newton Fund, which seeks to finance projects in various areas of national interest. The priorities established by the Mexican and British partners were as follows: biodiversity and the environment; capacity-building and partnerships; health sciences; innovation; sustainable agriculture and food security; as well as sustainable cities and infrastructure. Defining these priorities was a crucial step forward since Mexico faces enormous challenges. Some of the obstacles that Mexico faces to achieve fair and inclusive development include: social inequality, high rates of poverty, centralisation, violence, public health issues, climate change, loss of biodiversity, and sluggish economic growth.

In a first stage (2014-2017), the British Council, on behalf of the Newton Fund, together with its local partners allocated roughly £6 million through the Institutional Links and Researcher Links Programmes in Mexico. After the programme was extended to 2023, the total joint investment surpassed £8 million.

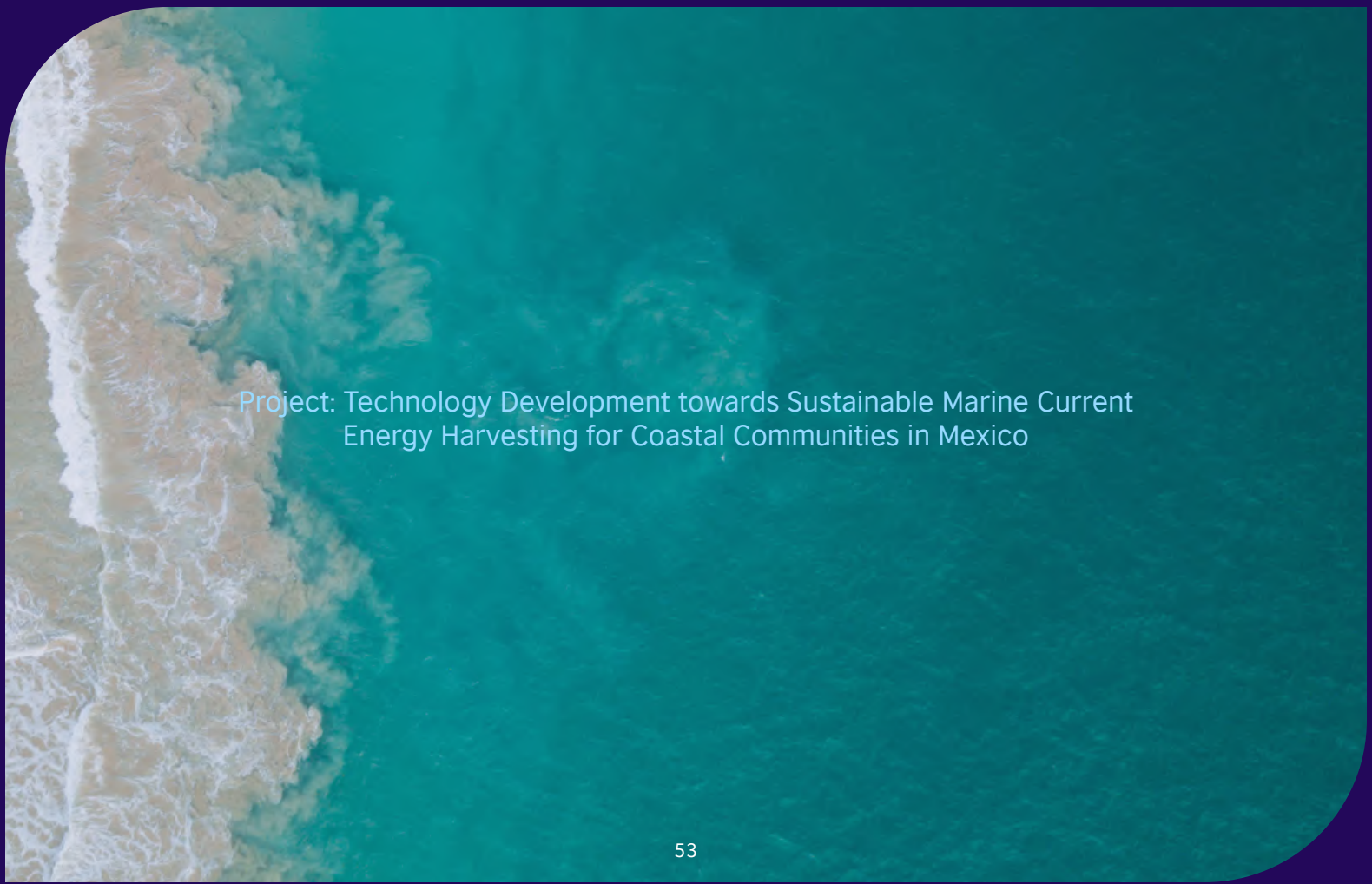
Another important programme led by the British Council was the Newton Fund Impact Scheme, developed as of 2019. This scheme granted additional resources to projects related to creative industries, as well as water and energy, such as "Reducing Social and Economic Inequalities through Creative Economy and Social Entrepreneurial Interventions in Southern Mexico," "Multimodality Instrumentation for Optimal Management of Irrigation Water Resources," and "Textiles to Terawatts: Exploring the Global Opportunity for Screen Printed Photovoltaics." These projects had previously

been funded by the Newton Fund through the Institutional Links Programme. The amounts allocated to these projects, which could reach a maximum of £200,000 per year, were used for new activities mainly focussing on achieving tangible results, especially in relation to generating favourable policy outcomes, as well as increasing interaction with both users and impact multipliers.

According to Arturo Mendoza, Head of Higher Education at the British Council Mexico, the main contributions of the Newton Fund to the research ecosystem in Mexico include, among other achievements, the fact that it helped internationalise research projects through the creation of networks between researchers from the United Kingdom and Mexico as well as through incorporating researchers from other countries via common partners. Some of the efforts were streamlined thanks to the existence of previous agreements with British institutions, such as letters of understanding, underlining the importance of the institutional work conducted at earlier stages.

However, the internationalisation of science and research in Mexico continues to face challenges. Work in the area of international cooperation can be hindered by bureaucratic realities. Discrepancies regarding payment schedules and fiscal years, for instance, can get in the way of international projects. Mendoza has stated that it is also necessary for researchers to consider, from an early stage, matters such as communicating project results and presenting metrics. There is also an opportunity to strengthen links with the private sector and continue contributing to the development of soft skills among young researchers. These steps are essential for Mexico to take innovation out of the lab and direct it where most needed: remote corners of its territory, where millions demand innovations to build a better future.

The Blue Economy: The Cozumel Current Can Be a Source of Clean Energy for Communities in the Mexican Caribbean



Project: Technology Development towards Sustainable Marine Current Energy Harvesting for Coastal Communities in Mexico

Climate is in distress and it is imperative that we put the brakes on fossil fuel consumption. In light of this reality, British and Mexican scientists and researchers have been working together since 2015 on marine energy harvesting. A series of projects on the coasts surrounding both the tropical island of Cozumel in the Mexican Caribbean and the cold and windy Orkney Islands in Scotland (the latter renowned for their extensive experience in generating renewable energies, mainly wind and ocean power) propose a route to address one of the most urgent tasks humankind is currently facing: the search for new sources of clean energy.

As part of the Paris Agreement and the 2030 Agenda, which establishes in Sustainable Development Goal number 7 the development of affordable and non-polluting energy, the United Kingdom has committed to reducing Greenhouse Gas (GHG) emissions by almost 80% by 2050. Mexico, in turn, has set the goal of cutting these emissions by 22% by 2030. It is thus extremely important to explore new experimental and sustainable energy sources for the environment, such as marine energy, whether it comes from sea currents, tides, waves, or temperature and salinity gradients.

To achieve these objectives, both countries appealed to the most recognised institutions in the field to bring together an experienced group of researchers that assumed the task of capitalising on the specific conditions of the marine currents in the Cozumel channel. The projects were financed by the Newton Fund through a partnership between the British Council and Conacyt, first through its Institutional Links Programme and, later, through the Newton Fund Impact Scheme (NFIS).

The team, led by Cameron Johnstone and Dr Stephanie Ordóñez from the University of Strathclyde, and Prof. Tim O'Doherty and Dr Matthew Allmark of Cardiff University, focussed its efforts on searching for and developing turbines that generate clean energy at low costs by harnessing the force of currents in specific areas.

In its first stage, the Mexican researchers led by Dr Laura Carrillo and Dr Alcérreca Huerta, representing ECOSUR, participated with their extensive experience in characterizing coastal and oceanographic processes in southern Mexico. They were joined by Dr Rodolfo Silva Casarín, Dr Edgar Gerardo Mendoza Baldwin, from the UNAM II Team, and Dr Ismael Mariño Tapia, from ENES-Mérida. In a second stage, with the participation of Drs Silva, Mendoza, and Mariño, an *ad hoc* device was developed adjusting to the conditions of the marine currents prevailing in the Cozumel channel.

The research yielded findings of great value for the future of renewable energies in Mexico. In general, the team was able to:

1. Identify the best type of turbine for harvesting marine energy in this area, as well as evaluating the energy potential of the Cozumel current.
2. Conduct a technical-economic analysis of the energy supply chain in the area.
3. Evaluate the potential for generating employment and economic growth in the region, mainly in the communities near the municipality of Carrillo Puerto, which has rates of poverty between 60 and 80%.

Mexico seeks to change the way in which energy is obtained and also capitalise on this opportunity for the technological and economic development of the region, since in order to implement and provide maintenance to these technologies, it is necessary to work jointly with communities who in turn would benefit from the creation of jobs outside of dominant sectors such as tourism.

There are still many challenges ahead. A preliminary proposal to support the next stages of the project is currently being formulated. These stages are intended to scale towards higher levels of proof of concept, specifically, setting up an adequate turbine, and evaluating the environmental impact it may have on the ocean floor.

For Mariño Tapia, it is a question of generating energy that is aligned with the environment and committed to avoiding damage to the marine ecosystem, since it would be pointless to install a turbine that would impact biodiversity or disrupt the life cycles of ocean species.

It is no easy task to install an appropriate turbine. First, existing turbines operating in places like Scotland need to be adapted to the potency of the Cozumel current, which is lesser but more persistent.

Research findings and conclusions were presented at an annual conference on wave and tidal energy in which several of the experts working on this project participated. A workshop was also held with members of the Ministries of Energy and Natural Resources, as well as the Mexican Council to Evaluate Social Development Policy (CONEVAL by its acronym in Spanish).

The project is moving in the right direction, but, as Mariño Tapia stated, the challenge we face as humankind is indeed enormous. “For over a century, oil has been exploited as our main source of energy, despite overwhelming evidence of the damage done to the environment. It is urgent to generate energy in a different way and capitalise on all available possibilities, because solar and wind on their own are not enough.”

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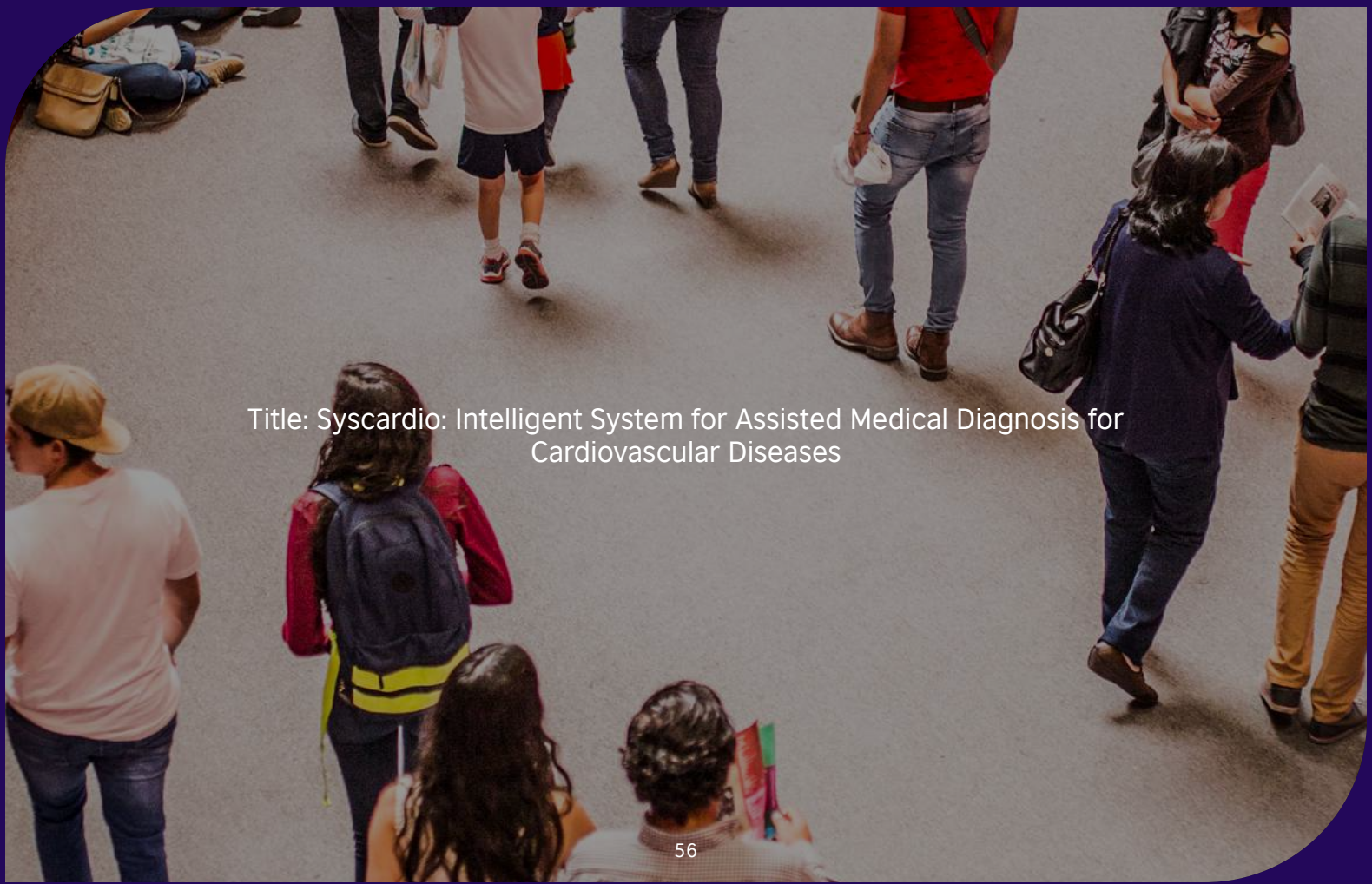
— Dr. Mariño Tapia

Mexico at the Medical Forefront: Researchers Develop A Device That Explores Heart Functioning in a Novel Way



Title: Syscardio: Intelligent System for Assisted Medical Diagnosis for Cardiovascular Diseases

Information technologies have changed the way in which we see and relate to the world. In the field of health, efforts are focused on obtaining, analysing, and processing clinical data in order to shorten the time devoted to each patient's diagnosis, treatment plan, recovery period, and follow-up. To do this, the scientific community seeks to develop devices aimed at visualising, modelling, analysing, and interpreting medical images. While the operation of these devices evokes science fiction, they instill hope. Thus, researchers from Mexico and the United Kingdom created a device that provides early detection of cardiovascular diseases.

The World Heart Federation estimates that cardiovascular diseases are the leading cause of death in nearly two-thirds of the world's population. One of these diseases is pulmonary hypertension (PH). Although its prevalence has not been adequately recorded, estimates suggest it affects more than 4,000 Mexicans. It is a degenerative condition that can only be diagnosed by catheterisation of the right side of the heart, an invasive, risky, and costly procedure, which increases the need for options that allow for early detection.

This project contributes to Sustainable Development Goal number 3 (Good Health and Well-being) of the 2030 Agenda signed by both Mexico and the United Kingdom. The research was supported by the British Council's Institutional Links Programme, and made possible due to a partnership between the Robert Gordon University in Scotland and the National Autonomous University of Mexico (UNAM) through the Centre for Advanced Computing Studies (CECAv), the Graduate School of Engineering, and the Institute for Research in Applied Mathematics and Systems (IIMAS). All of these institutions are experienced in the development of automatic methods for digital image analysis.

The development of a truly functional prototype required the participation of an interdisciplinary team from UNAM and the Robert Gordon University (RGU). Dr Boris Escalante coordinated the project in Mexico, mainly focussing on data acquisition and the development of computer vision algorithms in medical ultrasound imaging. Dr Carlos Moreno, in turn, who led the research team at the Robert Gordon University, is an expert in image recognition for the oil and gas industry, as well as having extensive knowledge in processing images and labelling data.

The success of this first prototype was based on close collaboration between the institutions and teams of both countries. Weekly meetings were organized via video calls and essential face-to-face meetings were held on a regular basis. Seminars were also organized to keep informed not only those team members directly involved in the work, but also the Mexican and British scientific and medical community related to the project.

The Robert Gordon University hosts robust infrastructure that enabled the development of research with cutting-edge technology, such as NVIDIA DGX-1 computers specialising in calculations and deep learning. This facilitated the imple-

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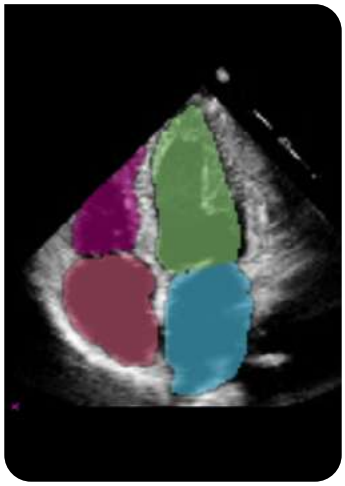
mentation of the methodologies developed at UNAM for operating the prototype.

The device developed by the researchers assists PH diagnosis by automatically analysing the right side of the heart in an innovative way, since, at present, existing devices can estimate parameters related to the left ventricle, but do not allow for analysis of the right ventricle or the two atria. The prototype developed by Dr Escalante and Dr Moreno does make it possible to carry out this analysis, which is a valuable contribution to the study of the heart.

New artificial intelligence algorithms and digital image processing were used to develop this prototype. Thanks to the interdisciplinary work of researchers specialising in video analysis, health experts, and software developers, the prototype has an interface that makes it easier for doctors to analyse and visualise data.

Among the medium-term plans for this prototype is to transfer it to the healthcare system in Mexico City, including the "20 de Noviembre" Medical Centre, which has expressed an interest in the technology. Should this transfer take place, it would benefit a considerable number of patients at the hospital, as well as the team of doctors who would receive training in the use of this new tool.

Information technologies, artificial intelligence, and data sciences are advancing rapidly and in multiple directions, some of which have a clear applicability for health and quality of life. Medical devices like Syscardio have placed Mexico at the forefront of medical research in heart-related studies.



Mexico City Seeks to Improve Water Security by Rescuing Wetlands

Project: Adaptation and Socio-Hydrological Resilience in the Peri-Urban Environment of Mexico City: Artificial Wetlands

The rapid expansion of urban sprawl in Mexico City has put hydrological environments and water security in peril, thereby compromising the city's future supply of drinking water. To address this issue, a team of scientists working on the outskirts of the metropolis developed an online tool to evaluate innovative solutions for communities to access water and preserve their ecosystems.

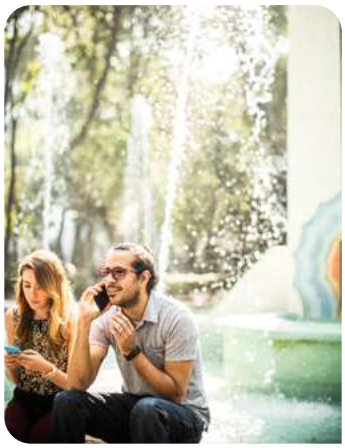
The urgency of addressing the issue of water conservation and accessibility is widely recognized by both the authorities and the scientific community, who acknowledge the need for immediate solutions. Despite the emergence of innovative initiatives and projects aimed at improving water security and accessibility, there is a lack of methodological tools to comprehensively evaluate their impact on communities. Merely having innovative solutions is not sufficient; it is crucial to ensure that these ideas are embraced and effectively implemented.

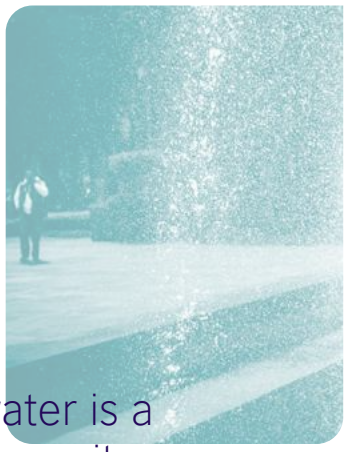
Socio-hydrological resilience (SHR) refers to the unique interplay between a community's socio-economic status, natural capital, urban well-being, vulnerability, and poverty in relation to water. It is crucial to develop adequate tools for measuring SHR to propose sustainable solutions for water resource management.

Thanks to a partnership between the British Council and Conacyt, this project is contributing to the achievement of Sustainable Development Goals (SDGs) 6 and 14 of the 2030 Agenda, which aim to ensure clean water and sanitation, as well as protect life below water. The project, supported by Newton Fund's Institutional Links Programme, involves the British Geological Survey, led by Dr Andrew Barkwith. Dr Barkwith is a specialist in quantifying the physical impacts of land use and climate change on geomorphology and water security. The Mexican counterpart is the Department of Social Sciences at the UAM Cuajimalpa campus, where Dr Miriam Alfie Cohen coordinated the work team. Dr Cohen has extensive experience in governance and institutions, environmental risk agents, and climate change mitigation in urban and peri-urban communities.

In order to develop a tool with which to evaluate SHR, the research team worked directly with the inhabitants of San Mateo Tlaltengo, a peri-urban settlement in the Desierto de los Leones National Park, in the southwest of Mexico City. This community was chosen for its specific socio-hydrological characteristics, since it has self-government mechanisms and is under ongoing pressure to have its land use changed. In addition, the water supply is self-managed and there are no formal sanitation services.

Thanks to a partnership between the British Council and Conacyt, this project is contributing to the achievement of Sustainable Development Goals (SDGs) 6 and 14 of the 2030 Agenda





The availability of water is a matter of national security as its prolonged scarcity or contamination could threaten the political stability of Mexico City. The development of this tool, along with others, to prevent such a scenario, offers a ray of hope and a trickle of optimism.

Artificial wetlands were installed by researchers in the community, including at a local school and the homes of three families, and were used as a parameter for the study and as a means to evaluate different initiatives that promote water security and access. The implementation of these wetlands was made possible through the involvement of women small-scale farmers in the area and the councils of *ejidatarios*, who are communal land holders in San Mateo Tlaltengo. This sector is recognized by the city government as part of historically indigenous communities and the active participation of community members enabled the development of more precise protocols for measuring SHR that are in line with the area's commercial and daily activities.

The proposed methodological tool will also support decentralised wetland-based sanitation solutions that still exist in various parts of the city, particularly in the districts of Tláhuac and Xochimilco. By involving communities in the process, they become empowered participants responsible for their water environment and aquatic ecosystems. The project also included a commercial strategy and market report aimed at increasing public awareness and encouraging community members and authorities responsible for peri-urban sanitation to take action. Additionally, a framework of potential ventures was developed to assist local governments and start-ups in promoting green and sustainable wetland-centred employment opportunities.

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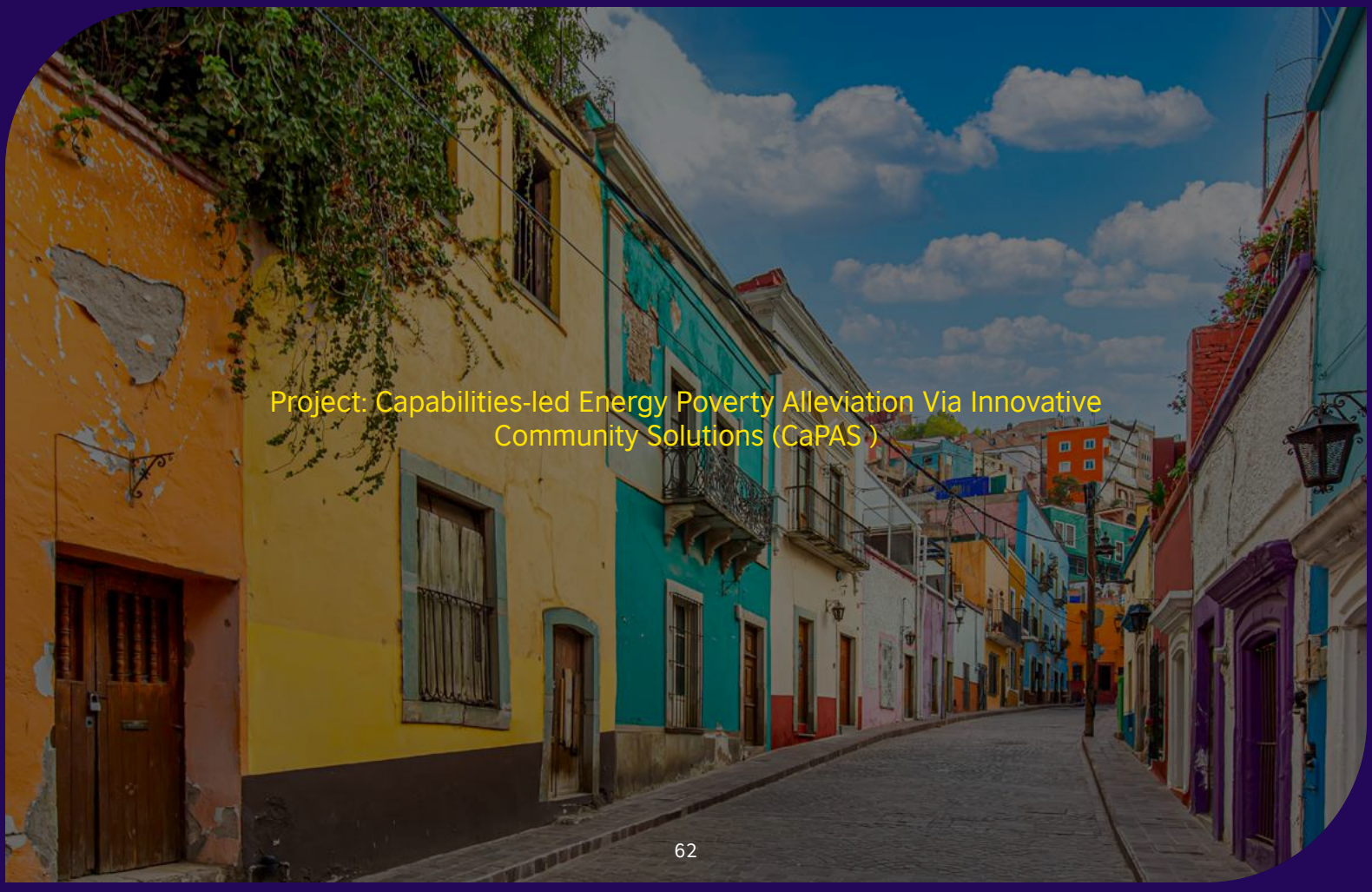
From the Bottom-Up: Communities and Scientists Unite to Combat Energy Poverty for 2030



Project: Capabilities-led Energy Poverty Alleviation Via Innovative Community Solutions (CaPAS)

Poverty manifests in many shapes and has diverse consequences. Energy poverty, in particular, impedes individuals with limited resources from exercising their rights to education, health, and social participation. In collaboration, experts from the United Kingdom and Mexico worked in communities within the States of Mexico, Morelos, Puebla, and Michoacán to address this issue.

Although the government of Mexico claims that its entire population has access to electricity, approximately one-third of the population still experiences energy poverty (EP). Simply having "access" to electricity does not necessarily mean that it can be used on a daily basis. In many cases, households may be located in areas where electricity is available, but they may not have formal access to it or may obtain it through informal means. This situation can be attributed to a lack of infrastructure, poor quality infrastructure, gender disparities, cost barriers, and various other factors that need to be better conceptualised and understood.

The CaPAS project, aimed at addressing energy poverty, received financing from the Newton Fund through a partnership between the British Council and Conacyt. Initially, it was supported through the Institutional Links Programme and later through the Newton Fund Impact Scheme (NFIS), allowing it to grow in size and involve institutions with recognised expertise in this area. Aligned with the 2030 Agenda, CaPAS contributes to achieving Sustainable Development Goal 7, which strives to provide affordable and non-polluting energy access

The UK team was led by Dr Harriet Thomson, a leader in EP measurement and mitigation from the University of Birmingham, in collaboration with Dr Ian Hamilton, an expert in methodological design for energy efficiency interventions at the UCL Energy Institute, both specializing in energy and the current challenges faced due to climate change.

The Mexican team was led by Dr Karla Cedano, from the Institute of Renewable Energies (IER by its acronym in Spanish) of the UNAM—a leading institution that is driving the transition towards a sustainable energy model in Mexico. Along with Dr Cedano, who focuses on social innovation, technology transfer, and effective communication of findings, the team included Dr Miguel Robles, Dr Manuel Martínez, and Dr Omar Masera, of the Research Institute in Ecology and Systems, who worked to support and monitor the project's progress.

In general, the academic team focussed its work and collaboration on advancing toward:

A

Creating a participatory methodology to identify and reduce EP by incorporating advanced technologies.

B

Identifying parameters to classify the severity of EP in rural areas.

C

Identifying and validating, with the community's assistance, technological solutions that prevent or mitigate EP.

As often is the case, the team faced a series of changing circumstances and unforeseen events that had to be solved as it moved forward. Specifically, the onset of the worldwide COVID-19 pandemic necessitated extra efforts in terms of adaptability and resilience.

In this regard, Dr Cedano highlights the flexibility demonstrated by the British Council, the Newton Fund, and Conacyt to match interests, agendas, and objectives in order to develop each project milestone. It was no easy task to adapt to working remotely, but all the parties involved showed great willingness.

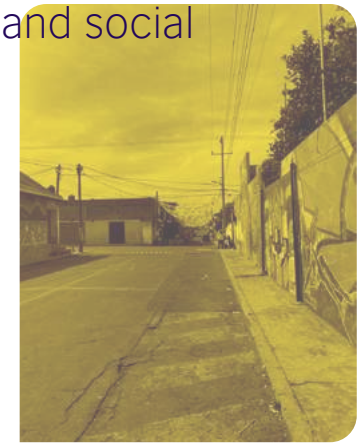
It was necessary to adjust budgets to the different institutional calendars, explore new forms of remote collaboration, and, in general, work and seek the best results amid a convulsed world in which everything familiar became disrupted.

As project leader, Dr Cedano faced the great challenge of creating channels of joint collaboration between peer researchers. Although the United Kingdom has a long tradition of sharing and developing knowledge, this work dynamic is still in the process of consolidation in Mexico. “Encouraging collaboration, taking the lead to align our objectives, and fostering knowledge development with a modest attitude promoted by one-to-one teamwork can make a huge difference,” according to Cedano.

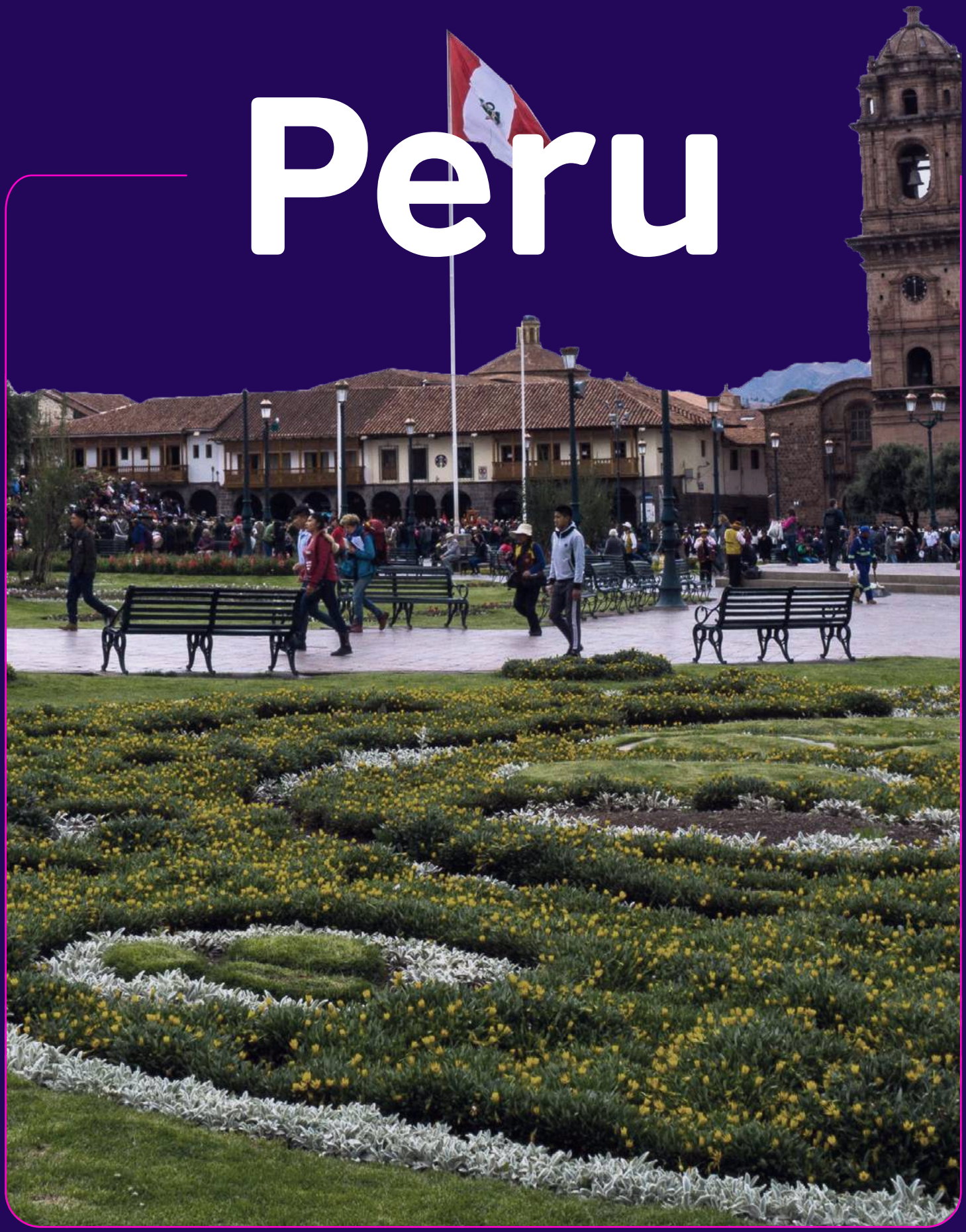
Among the greatest lessons gleaned from this project is the understanding that EP in the United Kingdom (the country where this term was coined) is very different from the energy poverty experienced in Mexico. The latter country suffers from considerable energy poverty derived from the population’s general living conditions. To address this EP, it is necessary to develop specific descriptions and treatment plans. Another main contribution is the community-oriented approach that was used and its bottom-up vision, which focussed on the communities rather than the authorities or institutions.

This is perhaps the greatest challenge for the future: to involve as many people as possible and rely on them to confront their EP. Therein lies the difference between traditional strategies, based on mere technological innovation and novel strategies based on specific capabilities and built from bottom to top.

Poverty manifests in many shapes and has diverse consequences. Energy poverty, in particular, impedes individuals with limited resources from exercising their rights to education, health, and social participation.



Peru




RIP CURL

Our work in Peru

TOTAL JOINT INVESTMENT

£2.3 MILLON

TOTAL NUMBER OF PROJECTS

36

PROGRAMMES IMPLEMENTED

RESEARCHER LINKS WORKSHOPS

RESEARCHER LINKS TRAVEL GRANTS

INSTITUTIONAL LINKS

PROFESSIONAL DEVELOPMENT AND ENGAGEMENT

NEWTON FUND IMPACT SCHEME

PARTNERS

CONCYTEC

NUMBER OF UK INSTITUTIONS

29

NUMBER OF PERUVIAN INSTITUTIONS

47

Our work in Peru

With 33 million inhabitants, Peru is the fourth most populated country in South America and enjoys abundant biological, cultural, and social diversity. After ten years of economic growth driven by sectors such as mining and export-oriented agriculture, at the end of the past decade Peru was facing a key moment for the development of technological and scientific innovation adapted to its national reality, as doing so would allow it to address several of its most pressing challenges, including social inequality, climate change, the loss of biodiversity, and the gap between rural and urban. Although Peru is today facing the severe consequences of the pandemic as well as several political crises, science and innovation still hold an important space.

The Newton-Paulet Fund, named after the Peruvian inventor Pedro Paulet, focussed efforts on five priority development areas, which were jointly defined by the United Kingdom and Peru: health and life sciences, innovation, sustainable agriculture and food security, climate change and the environment, capacity-building and alliances, as well as sustainable cities and infrastructure.

Starting in 2017, the year in which the Newton-Paulet Fund began operations in Peru, the British Council, as the UK's implementing partner, signed partnerships with the National Council of Science, Technology and Innovation (CONCYTEC by its acronym in Spanish) of the Peruvian government. Both institutions spent approximately £2.3 million in different joint projects focussed on supporting research.

Throughout its years of operation, the Newton-Paulet Fund significantly increased scientific and technological cooperation between the United Kingdom and Peru. "Newton has been a way for CONCYTEC to establish an innovative way to link [with the UK] in order to develop research partnerships in Peru," stated Claudia Celis, Deputy Director of Economic Development and Programme Manager at the British Embassy. Through this instrument, more than 37 projects were supported in 9 provinces. In addition, more than 1,000 senior researchers and 36 researchers in the early stages of their careers benefitted from the Fund. The accomplishments have established the United Kingdom as a key partner of Peru in the realms of science, technology, and innovation.

The Newton-Paulet Fund also represents a new model for financing projects in Peru, since most of the project financing between the partners was secured through match funding, unprecedented in the country.

The projects supported by the Newton-Paulet Fund cover a wide range of experiences that characterise present-day Peru. Whether it is understanding the impact of melting glaciers in remote communities in the Andes, or positioning a national conversation about the possibility of establishing a botanic garden, the Fund has contributed to these and other initiatives related to both the territory and national spirit. Together with the British Council, the Newton-Paulet Fund also included specific training opportunities for those who formulate and implement policies and research programmes

in Peru, including Professional Development & Engagement, which comprises the Mission-Oriented Research and Innovation Programme. The latter focussed on promoting cross-cutting innovation, convening sectors, stakeholders, and multiple disciplines, in order to facilitate solutions and experiment with bottom-to-top approaches. Both spaces were of special interest to the Peruvian counterpart since they strengthened research-related public policy advocacy capacities.

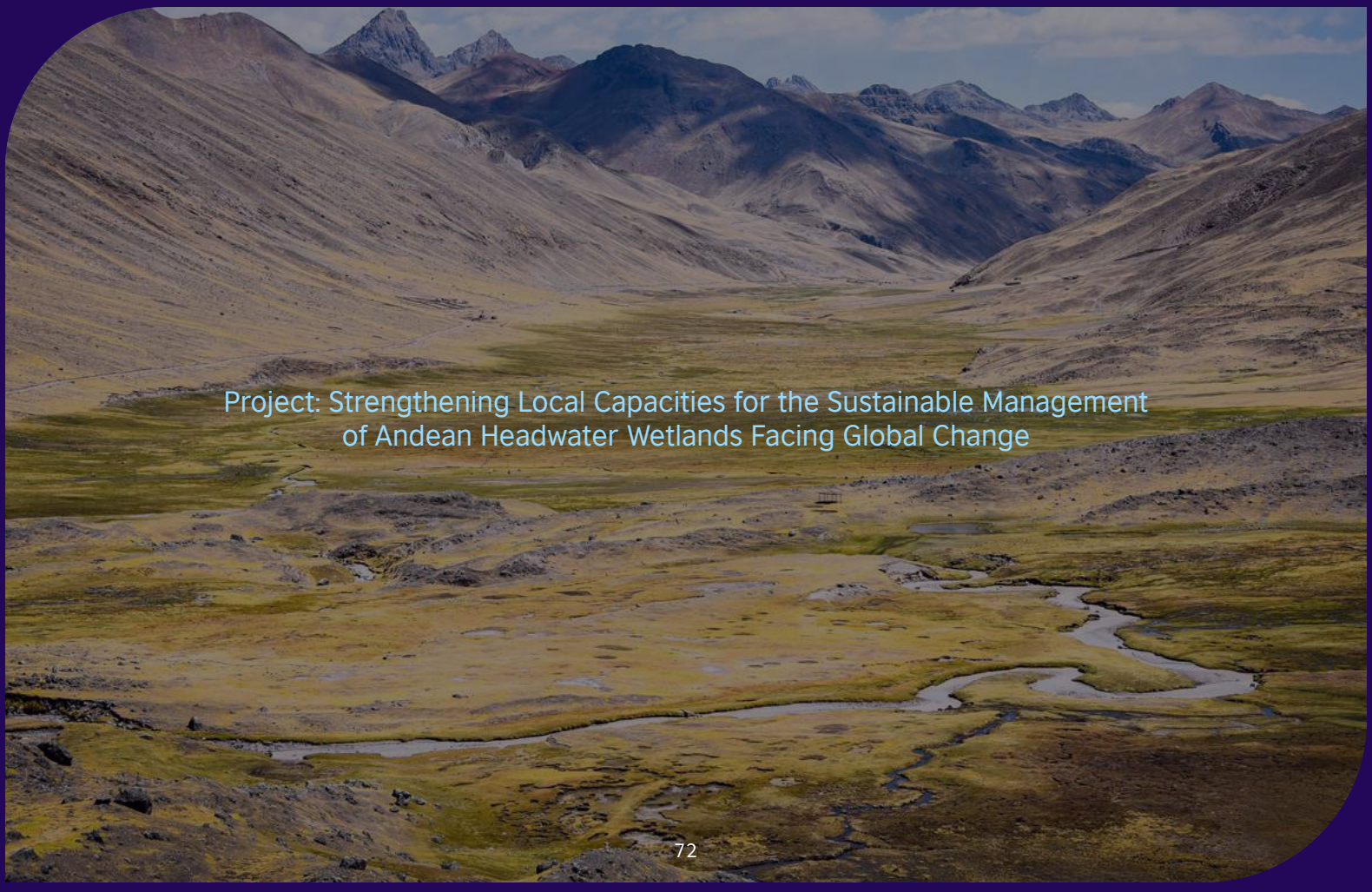
Through the British Council's efforts, the Newton-Paulet Fund helped establish links and opportunities for long-term cooperation between researchers, private companies, and stakeholders in the innovation ecosystem. Programmes aimed at inter-institutional cooperation in the country included: Institutional Links, Researcher Links Travel Grants, Researcher Links Workshops, Professional Development and Engagement, as well as the Newton Fund Impact Scheme. Some of the projects backed by these programmes include: "Genomic Epidemiology of Drug-Resistant Tuberculosis in Peru", "Multi-Morbidity and Infectious Diseases: Strengthening Links between the UK and Peru", "Water Governance in Mountainous Regions: Drivers and Adaptive Responses to Global Change", and "Building Resilience in Flood Disaster Management in Northern Peru".

The prospect of innovation in Peru continues to face obstacles. The reduction of regulatory, administrative, and bureaucratic burden is one point that most agree would enable scientific and technological innovations to benefit a wider range of Peruvians.. Greater financing can also be conducive to developing better projects, since it is clear that there is a need to strengthen partnerships and collaborative work.

The Newton-Paulet Fund highlighted the important role that scientific exchange programmes can play as a way of promoting collaboration. In Peru, in particular, international cooperation within the framework of the Newton-Paulet Fund nurtured a budding research ecosystem of global ambitions, which delivered outstanding results in numerous areas and disciplines. It has produced a strengthened group of managers and professionals in science and innovation that will continue to find solutions to the nation's challenges. Its legacy also includes public policy proposals, such as the creation of a national botanic garden, declared by the Peruvian Congress as a matter of national priority, as well as the need for a scientific advisory unit in Peru. All this while contributing to build a network where horizontal collaboration among partners is a core value.


UK Health
Security
Agency

The Water that Nourishes Peruvian Cities Springs from the Heights of the Andes: The Time Has Come to Protect the Andean Wetlands



Project: Strengthening Local Capacities for the Sustainable Management of Andean Headwater Wetlands Facing Global Change

The Andean wetlands, situated in the heights much like the aerial waters referred to by poets, act as oases in a semi-arid land, providing a vital supply source for both human communities and the region's wildlife.

This project, which was supported by the British Council and FONDECYT's Basic and Applied Research Projects under the Institutional Links Programme, aimed to explore practical solutions for water sustainability. It focused specifically on studying the Puna wetlands, situated at the head of the Cachi watershed in Ayacucho. These are considered socio-ecological systems in which natural and human processes converge. What takes place there can affect water availability and quality, which in turn impacts human dynamics and the ecosystem in general. From a scientific and sustainable development perspective, the Andean Puna wetlands have not been as widely studied as the tropical glaciers and, therefore, there is not much information about the effects that climate change and climate variability have on these ecosystems. However, high-altitude wetlands play an even more crucial role in the hydrology and well-being of most Peruvians than glaciers, since they are essential in replenishing the watersheds and, therefore, play a central role in supplying water to the urban and economic centres in Peru, as is the case of the city of Ayacucho, which has 200,000 inhabitants.

This project, led by Dr Chad Staddon, from the University of the West of England (UWE) and Dr Bram Leo Willems, from the Cayetano Heredia Peruvian University (UPCH by its acronym in Spanish), lasted 12 months, starting on March 1, 2019. Dr Raúl Loayza, also from the UPCH, and Dr Wouter Buytaert, from the Imperial College London also participated. Specialists from the National University of San Cristóbal de Huamanga (UNSCH), the Ayacucho Centre for Agricultural Development (CEDAP), and the Water Competence Centre (CCA) were also involved.

The project was part of the Andean Water Programme (Programa Agua Andes), which had seen previous collaboration between the institutions mentioned. It helped to design ecosystem strategies for Ayacucho and create decentralized technical-scientific talent pools. The project thus had a favourable impact on Sustainable Development Goals 6 (Clean Water and Sanitation), 13 (Climate Action), and 15 (Life on Land).

The project's objective was to improve the understanding of the links between the Andean Puna wetlands, the ecosystem services they provide, and their impact on human well-being in order to provide practical solutions for water sustainability in the semi-arid Andes. According to the Ministry of the Environment, approximately 40% of Peru's territory is dryland hosting important population and agricultural centres. Therefore, the ecosystems of the Andean headwaters are of critical importance for water security, since they attenuate seasonal rainfall, which generates sustained baseflows during the dry season.

Approximately 40% of Peru's territory is dryland hosting important population and agricultural centres.

Climate change has induced glacier retreat and altered rainfall and temperature patterns in the Andes, increasing uncertainty about the functionality of water-regulating ecosystems. In addition, population growth and new market opportunities have driven the expansion of water-intensive economic activities, such as agriculture, raising livestock, mining, and hydropower production. All this has placed more pressure on water resources.

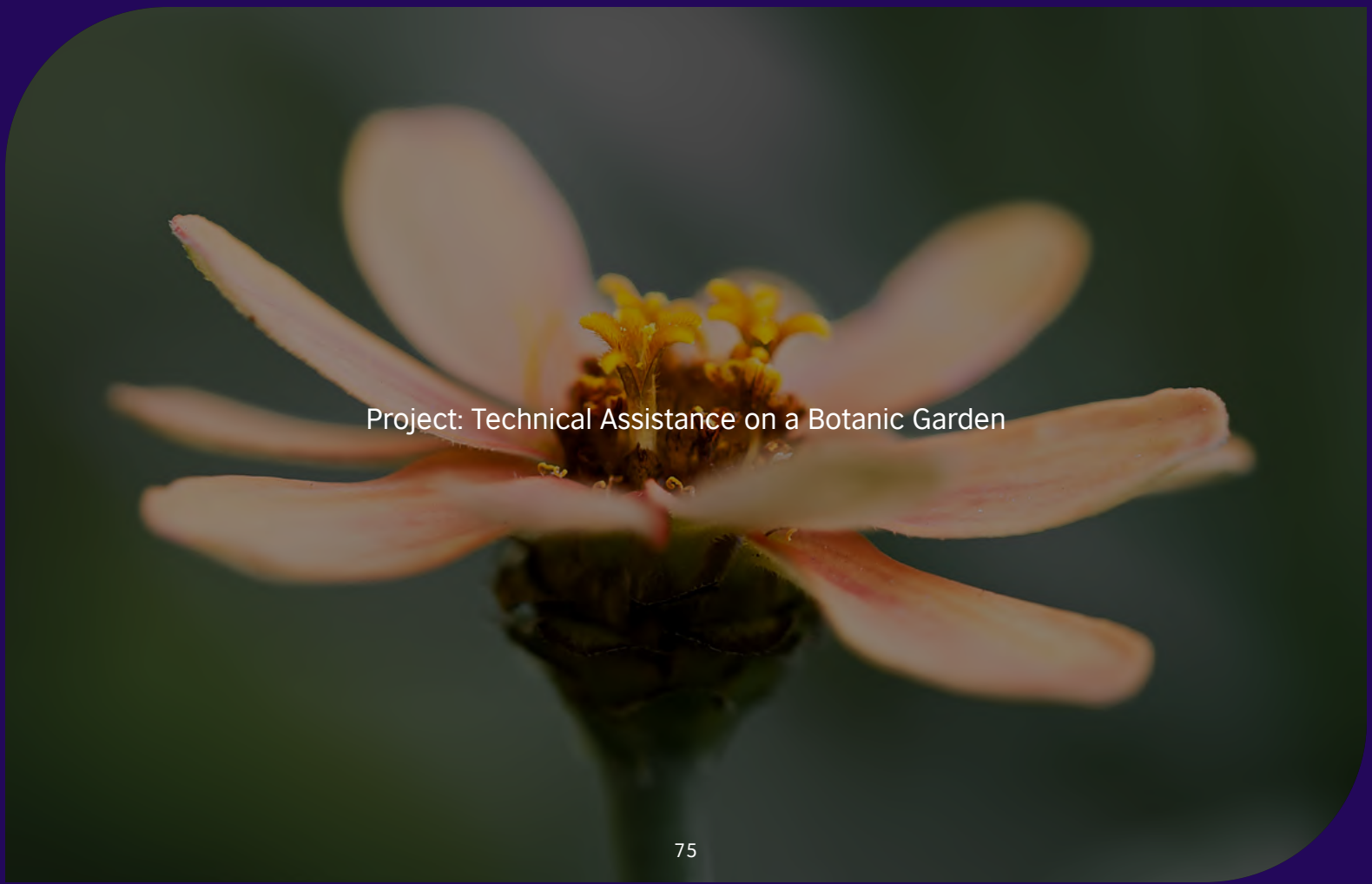
The research objectives also consisted of documenting the hydrological functionality of the Andean wetlands and their contribution to water availability throughout the Cachi watershed, as well as establishing the links between water quality and the ecosystem through indexes based on community ecological indicators in order to eventually establish critical factors at a human and community scale.

For UK researchers, this collaboration enabled the development of methodological and linguistic skills for working in Andean communities. It also provided an opportunity to refine and develop both existing and novel research skills, taking into account that water sustainability requires new strategies that are beyond the standard infrastructure—dams or grey water canals, for instance—in order to adapt to a demand for a resource that is, by its nature, limited.

For the Peruvian colleagues and scientists, this project reinforced the implementation of new field evaluation techniques. In addition, it contributed to an approach integrating natural and social sciences, uncommon in the Peruvian scientific field.

Furthermore, the individuals involved and partner institutions complemented each other, achieving research that integrates the bond between the natural water cycle and the human-implemented water cycle, a topic that responds to the demand for innovative solutions to address the challenges imposed by global changes regarding this urgent matter.

Towards a Botanic Garden in Peru



Project: Technical Assistance on a Botanic Garden

For centuries, gardens have been perceived as enchanted spaces, occupying a halfway point between nature and conscious human design. The Persians viewed them as places of delight, the Greeks as areas for reflection and worship, the French as baroque expressions of vanity, and the English as extensions of romantic landscapes. Botanic gardens—first created in Europe as spaces for scientific curiosity, which over the centuries became educational, research, and innovation centres—are a testimony of the relationship between human beings and plants, which still holds many mysteries to be unveiled.

The project "Technical Assistance on a Botanic Garden", conducted by Professor Thomas R. Meagher and Dr Laura R. Meagher, from the University of Saint Andrews focused on exploring how a botanic garden can enhance our knowledge of the biodiversity of a country like Peru. It was supported by both the British Council, representing the Newton Fund, and the National Council for Science, Technology and Innovation (CONCYTEC), through the Professional Development & Engagement Program (PD&E). The project was developed between September, 2019 and April, 2020, and consisted of implementing a feasibility study that could serve as a guide for Peru to create its own national botanic garden, a yearned for project that would favourably impact Sustainable Development Goals 4 (Quality Education) and 15 (Life on Land).

The project considered economic, touristic, educational, and scientific aspects, as well as the national image, health, recreation, and enjoyment in order to develop the technical, legal, and business model that would enable a central botanic garden linked to other botanic gardens throughout the country. This would allow Peru to come into contact with international botanical research, setting up a network of exchanges with leading specialists.

According to Franca Mazzotti, project manager of Pronaturaleza, the collaboration with the University of Saint Andrews was "a good marriage, because Thomas and Laura collaborated with the *know-how* they have acquired after years of working internationally in botanic gardens [and their in-depth knowledge about] the technical aspects and global standards. Peru, in turn, contributed with the entire local legal and economic framework. This led to an optimal exchange of knowledge and mutual understanding." Both the feasibility study and a framework were thus established to overcome the challenges of the Peruvian reality, tracing a potential route to materialise the botanic garden project.

Botanic gardens—first created in Europe as spaces for scientific curiosity, which over the centuries became educational, research, and innovation centres—are a testimony of the relationship between human beings and plants, which still holds many mysteries to be unveiled.

Mazzotti insists that the botanic garden project is an initiative that can only work as an effort of both the public and private sectors. It must emerge and develop as a joint effort. Mazzotti cites the National Theatre of Lima as an inspiring example, as it serves as a successful model similar to the garden project due to the significant infrastructure deployment it once required.

The most significant finding of this study is that the notion of a national botanic garden is beneficial from various perspectives. It would both reinforce educational efforts and benefit biodiversity research and dissemination in Peru. In addition, public opinion values biodiversity conservation as something of vital importance. By securing the participation of various stakeholders in the implementation of the national botanic garden project, botanical research in Peru can be bolstered in the short and medium term, while also promoting its long-term resilience. To accomplish these objectives, the researchers concluded that it is necessary to carry out a detailed feasibility study in order to determine the next steps towards establishing the project.

The findings highlighted that the national botanic garden should include a permanent research team, as well as collections and conservation efforts with a view to educate and raise awareness, activities requiring a specific infrastructure, such as laboratories, spaces for collections, herbariums, seed banks, living collections, educational and recreational facilities, as well as auditoriums for conferences and teleconferences. Agreements were also reached regarding the scale, nature, physical infrastructure, and costs of options for each element, which must be developed by the feasibility study. The location of the botanic garden is also a key point, as well as its size and its guiding models. The study mentioned above will include all of these suggestions, which aim to enhance Peru's capacities. To optimize its potential, it is recommended that collaborations be facilitated and national botanic garden programs be complemented with programs from other Peruvian institutions, universities, research stations, herbariums, museums, and gardens.

The study's findings also suggest that the feasibility study should incorporate an examination of international connections, including an exploration of best management practices to establish research partnerships with UK institutions. This could also benefit the administrative side of the project, by facilitating the sharing of best practices for complying with international laws and regulations on biodiversity.

Finally, the specific possibility of implementing the botanic garden project in Peru could create a unique site of international relevance. Combining knowledge about Peru's plant diversity with an understanding of its enormous cultural diversity, would strengthen the garden's unique identity with scientific dissemination as its main ally.

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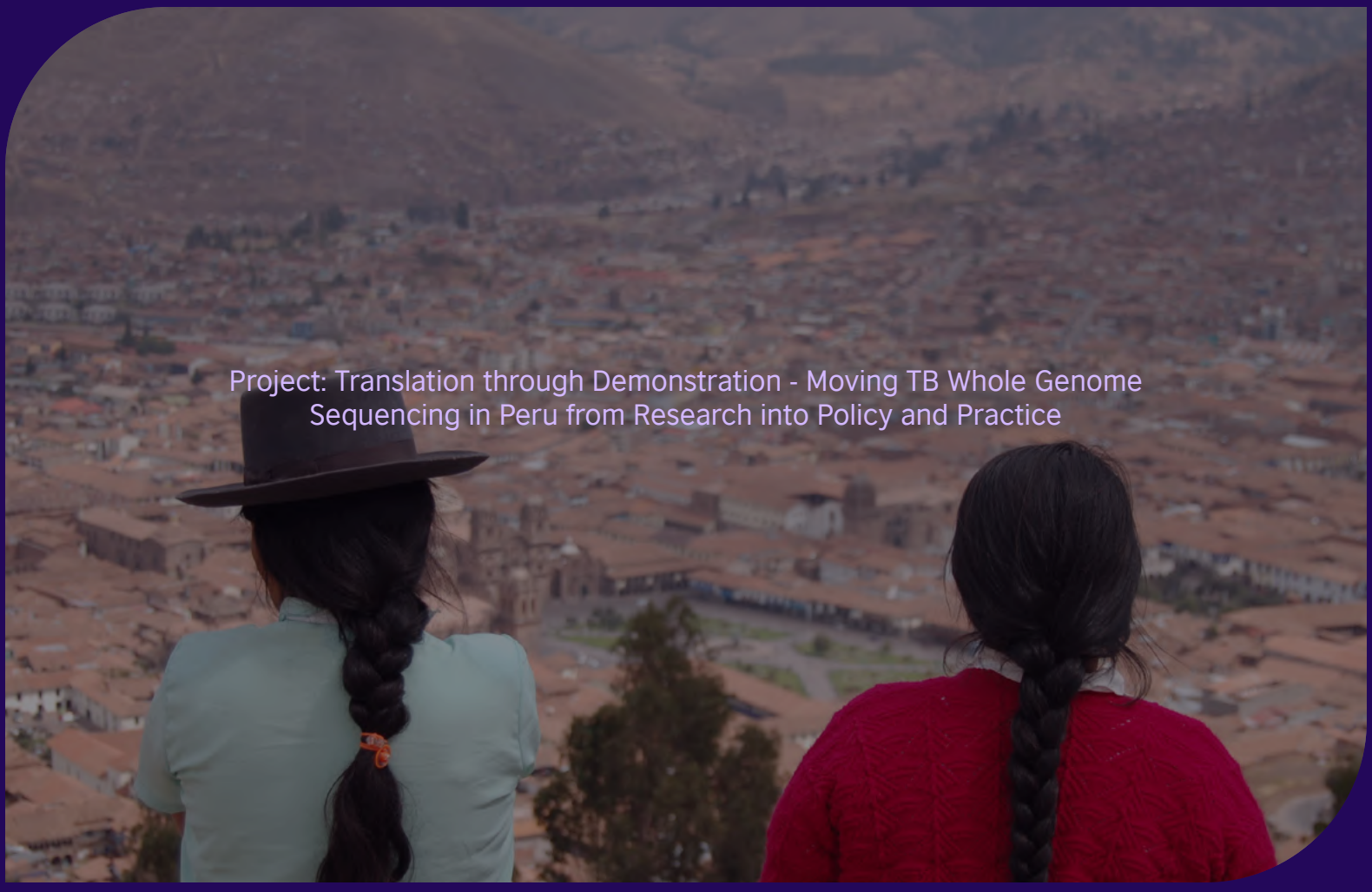
Tuberculosis in Peru Contains a Secret: Deciphering its Genome Could Help Fight TB



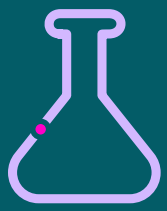
Project: Translation through Demonstration - Moving TB Whole Genome Sequencing in Peru from Research into Policy and Practice

A land of unimagined exceptions, Peru is also the country with the highest incidence of multidrug-resistant tuberculosis (MDR-TB) in the Americas. For this reason, the medium-term objective of this collaborative research—based on a previous project of the Institutional Links Programme entitled "Genomic Epidemiology of Drug-Resistant Tuberculosis in Peru" with support in this second stage from the Newton Fund Impact Scheme—is to introduce the Whole Genome Sequencing (WGS) of *Mycobacterium tuberculosis* (MTB) strains in routine laboratory diagnostics.

Peru is a country with an intense history of TB diagnostic innovation, early adoption and implementation of diagnosis, coupled with an urgent need to expand the response to MDR-TB, caused by the TB bacteria that are resistant to drugs such as rifampicin and isoniazid.

The United Kingdom, through Public Health England (PHE), has been a global pioneer in introducing this tool into the National Public Health Service. This has allowed for accurate and rapid testing to detect resistance to anti-tuberculosis drugs. In 2021, the World Health Organization (WHO) published the first complete catalogue of mutations associated with resistance to 13 anti-tuberculosis drugs, which increases confidence in the use of molecular methodologies, such as WGS, for the detection of mycobacterial susceptibility.

Today, both mutation detection and demonstration of resistance to first- and second-line anti-tuberculosis drugs can be reliably performed, as noted in studies published in journals such as *The Lancet* and *NEJM*. The United Kingdom intends to transfer such technology to Peru. The main objective of this research was, therefore, to lay the foundations for the implementation of WGS in routine work in Peru, thus contributing to Sustainable Development Goal number 3 (Health and Well-being).



The project was led by Dr David Moore, from the London School of Hygiene and Tropical Medicine (LSHTM) and Dr Zully Puyen, from the National Health Institute (INS by its acronym in Spanish) pertaining to the Peruvian Ministry of Health.

Among the study's different objectives, a priority was to develop an intersectoral consensus regarding the current and future role of whole genome sequencing in Peru, both for patient care and for national tuberculosis control. Another priority was to establish a workflow as a WGS model at the INS's National Reference Laboratory for Mycobacteria (LRNM by its acronym in Spanish) for routine clinical samples from regional laboratories and medical centres throughout the country.

This project included Dr Puyen's initial trip to visit the PHE headquarters in London and Birmingham, for face-to-face training in both technical and administrative processes related to routine WGS services in England. As a result of this visit, collaboration ties were strengthened, establishing the line of work to be developed in Peru.

In addition, the project conducted a real-time demonstration pilot project on 140 laboratory samples to compare the time it takes to obtain results using these methods versus conventional drug resistance testing. The study results were disseminated among stakeholders, including various tuberculosis research groups in Peru, highlighting that WGS can adequately serve as a diagnostic and resistance-detection tool for anti-tuberculosis drugs used in the national health system.

WGS, under routine conditions at the LRNM laboratory, provided results in a much shorter time span than those offered by conventional methods based on microbiological cultures. WGS can obtain the complete series of results for 13 anti-tuberculosis drugs in a single analysis and is not limited by MTB culture contamination problems. WGS allows for real-time genomic surveillance of drug-resistant strains circulating in Peru. This is done through characterising lineages and families, as well as detecting clusters of genomic transmission. Together with epidemiological data, all this information will contribute to eradicating tuberculosis in Peruvian communities. This study also laid the foundations for collaborative work between different organizations of the Peruvian State in order to maximize their efficiency, optimize shared data, and establish the standardisation of minimum data sets.

As an upper-middle-income country and one of the thirty countries with the highest burden of MDR-TB worldwide, Peru is well positioned to make full use of this transformative technology, demonstrating the potential impact of implementing these tools to other affected countries. In addition to improving the detection of drug resistance, the library of genomic mutations presenting drug resistance is increasingly extensive and representative worldwide. WGS also analyses how strains relate to each other, allowing rapid identification of critical transmission points.

Seeds of Hope: In the Face of Climate Threats, Identifying Varieties of Climate-Resilient Cereal Can Lead to Better Harvests for Small-Scale Farmers Facing Vulnerability

Project: Applying and Evaluating a New Quantitative Method to Select Climate-Resilient Cereal Varieties to Improve Farmer Livelihoods and Community Nutrition in Peru

As in much of the world, climate change is a direct threat to Peru's food security. Because of phenomena such as El Niño, Peru's crops are continuously affected in its most vulnerable areas—the south—where native grains such as quinoa, as well as cereals such as wheat and barley, and tubers such as potatoes—of which there are more than 4,000 native varieties in Peru—provide food to Peruvian families living in the mountainous regions. In those areas, climate instability directly impacts the scarcity of water, lowering crop yields to less than a quarter of their optimal figures. When meteorological events disrupt historic weather patterns, Peru is forced to import food. To address this challenge, small-scale farmers in the region may need to cultivate climate-resistant crop varieties to ensure food security.

This research project was carried out by Dr Jorge Jiménez Dávalos, from the La Molina National Agrarian University (UNALM by its acronym in Spanish) and Prof Ian Dodd from Lancaster University in order to understand and address the issue. Supported by the British Council's Newton Fund Impact Scheme from February, 2021 to November, 2022, the project used historical improved crop yield data obtained from the 2019 Institutional Links Project "Phytohormone Phenotyping in the Field for the Selection of Climate-Resistant Cereal Varieties – YSSI," led by Dr Luz Gómez Pando, from UNALM and Prof Ian Dodd.

The project validated a quantitative method for identifying the most productive wheat varieties that are best suited to Lima's climate, thus aiding the development of genotypes that have the potential to adapt to drought conditions and contribute to Sustainable Development Goal 2 (Zero Hunger) of the 2030 Agenda.

Working shoulder-to-shoulder with regional institutions, the project sought to understand the impact of improved varieties to ensure food security and the well-being of Peruvian communities from a nutritional and economic perspective. This project tested the resilient and high-yielding wheat varieties selected in the Peruvian highlands. Parallel to this, it analysed the UNALM's quinoa genotypes, and tested them among the local public (UNA in Puno, UNALM in Junín and Lima) and the private sector (producers in Cuzco and Recrías América S.A.C. in Arequipa). Coming in contact with stakeholders made it possible to foster commercial and livelihood activities to boost self-reliance and the local economy. In addition, agricultural economists (Recrías América S.A.C) and university nutritionists (Universidad Nacional San Cristóbal de Huamanga) modelled the long-term impacts of these new genotypes on the target communities.

A project like this, with multiple test sites and a diversity of partners, needs to jointly manage and save data. To do this, using the aforementioned YSSI method developed in 2019, cloud storage of data continued to improve, allowing all participants to share documents and data in real time. To disseminate findings, the project conducted short online courses and face-to-face workshops that explained the methodology to communities. The information on improved varieties was disseminated through open days on the test sites, the social media accounts of UNALM and its partners, as well as the project's website.

The research was carried out in collaboration with Golondrinas, a Spanish NGO that maintains the project's website active in English and Spanish (https://ong-golondrinas.es/proyectos/yssi-en/), and which continues to grow as the work evolves. The tools developed by this project, its publications, and other knowledge transference activities can be found in this virtual repository.

The participation of the agro-export company Recrías América S.A.C (RASAC) should also be noted. Under the direction of Carlos Lozada García, MA, and Luis Apaza Surco, professional engineer, open field experiments were conducted with quinoa crops in order to mediate the evaluation of the economic impact of sowing improved variety seeds. Other participants included the Peruvian National Service of Meteorology and Hydrology (SENAMHI), the Hermilio Valdizán National University (UNHEVAL), and the National University of Central Peru (UNCP).

Another key partner was Peru's Regional Agrarian Department, which, with the guidance of expert Wilfredo Gonzales Valero, carried out an economic assessment of the impact of the project's results on farmers in the Peruvian mountainous regions. This analysis was extended to other areas of Peru in which the project has experimental sites. In addition, the project participated in designing the Productive-Nutritional Survey developed within the project's framework.

The project was supported by colleagues such as Edith Pillaca Medina, MA, from the National University of San Cristóbal de Huamanga (UNSCH), Alfredo Beyer Arteaga, MA, Andrés Casas Díaz, MA—current dean of the Graduate School of Agronomy—and Dr Perla Chávez Dulanto of UNALM. They all worked in close coordination with professors Dodd and Jiménez Dávalos, and through their respective research teams, applied and evaluated the current nutritional status of the population residing in the Peruvian mountains (particularly in the Puno region and other experimental sites) according to the local food supply.

Working shoulder-to-shoulder with regional institutions, the project sought to understand the impact of improved varieties to ensure food security and the well-being of Peruvian communities.

Appendix Colombia

Appendix 1	Researcher Links Workshops

Workshop 1: Bamboo as a Construction Material

2014 - 2015

Colombian Institution	**UK Institution**
Universidad de Los Andes	University of Bath
Universidad del Valle	University College London (UCL)
Universidad Tecnológica de Pereira	Liverpool University
Apiros	Coventry University
	Oxford Brookes University
	University of Sheffield
	ARUP

Workshop 2: Strengthening Innovation and Research Cooperation between the United Kingdom and Colombia (The Role of Foresight and Horizon Scanning)

Partner: ICETEX / 2015 - 2016

Colombian Institution	UK Institution
Universidad de Valle	Manchester Enterprise Centre, MBS
Universidad Externado de Colombia	Manchester Institute of Innovation Research
Observatorio Colombia de Ciencia y Tecnología (OCyT)	SPRU, University of Sussex
Universidad del Rosario	University of Manchester
Universidad Cooperativa de Colombia (UCC)	Centre for Environmental Policy, Imperial College London
Pontificia Universidad Javeriana	University College London (UCL)
Universidad Nacional de Colombia	Nottingham Trent University
Universidad de Cartagena	University of Southampton
Universidad Mariana	Hugh Sinclair University of Reading
Corporación Universitaria Adventista en Medellín (UNAC)	Imperial College London
GIC Politécnico Colombiano	Heriot-Watt University, Edinburgh
Corporación Biotec	University of Edinburgh
Universidad EAN	University of Exeter
	King's College London
	University of Warwick
	City University London
	Imperial Centre for Energy Policy and Technology

Workshop 3: Marine Sciences and Technologies Promoting Collaboration for Interdisciplinary Research and Professional Opportunities Between Colombia and the United Kingdom

Partner: ICETEX / 2015 - 2016

Colombian Institution	UK Institution
Universidad del Valle	Heriot-Watt University
Universidad Nacional de Colombia sede Medellín	University of Manchester
Universidad de Los Andes	SAMS - University of Highlands and Islands
Universidad Industrial de Santander	University of Stirling
Universidad Santo Tomás	University of Leeds
Pontificia Universidad Javeriana Sede Bogotá	University of Plymouth
Universidad de Antioquia	University of Aberdeen
Universidad de Cartagena	Natural History Museum London
Pontificia Universidad Javeriana Sede Cali	ERI - University of Highlands and Islands
Centro de Innovación y Tecnología (ICP)/Ecopetrol	Edinburgh Napier University
Fondo Mundial para la Naturaleza Colombia (WWF Colombia)	CEFAS Government Laboratory
Universidad Jorge Tadeo Lozano	University of York
INVEMAR	International Whaling Commission
Universidad Cooperativa de Colombia sede Medellín	University of Bristol
Universidad Nacional de Colombia	

Workshop 4: Interdisciplinary Workshop to Face Climate Change in Coastal Areas

Partner: ICETEX / 2015 - 2016

Colombian Institution	Colombian Institution
Universidad Sergio Arboleda sede Santa Marta	Bangor University
Ministerio de Ambiente y Desarrollo Sostenible	University of Bristol
Universidad La Gran Colombia	University of Southampton
Universidad El Bosque	National Oceanography Centre
Comisión Colombiana del Océano	University of Chichester
Universidad de Antioquia	University of Bristol
Universidad Cooperativa de Colombia (UCC)	Plymouth University
Universidad de Ciencias Aplicadas y Ambientales (UDCA)	University of Liverpool
Universidad EAFIT	Southampton Solent University
Universidad Libre	
Universidad de Medellín	
PLAYASCORP	
INVEMAR	
Ministerio de Transporte	

Workshop 5: Working on Land Restitution and Structural Inequalities in Transitional Justice

Partner: ICETEX / 2015 - 2016

Colombian Institution	UK Institution
Instituto Pensar, Universidad Javeriana	University of Essex
Grupo de Análisis – Unidad de Restitución de Tierras	Anglia Ruskin University
Universidad del Norte	University of Nottingham
Universidad Nacional de Colombia	University of Kent, Kent Law School
Corte Constitucional de Colombia	Crucible Centre for Human Rights Research, University of Roehampton
Universidad Pedagógica Tecnológica de Colombia	Latin American Centre, University of Oxford
Universidad del Rosario	Transitional Justice Institute (Ulster University)
Universidad EAFIT	School of Law/Transitional Justice Institute, University of Ulster
Unidad de Justicia Transicional, MAPP-OEA	Department of Politics, University of Sheffield
Misión de Apoyo al Proceso de Paz en Colombia (MAPP-OEA).	Peace and Social Relations, Coventry University
Área de Reparación y Reconciliación para la Misión de Apoyo al Proceso de Paz, MAPP-OEA	Department of Sociology, University of Oxford
Universidad del Norte	Birkbeck College, University of London
Centro de Estudio de Justicia y Sociedad	University of East London
Gobernación de Santander, Atención Integral a Víctimas	University of Sussex, Centre for Global Political Economy
Alcaldía de Medellín	University of Manchester

Appendix 2	Researcher Links Travel Grants

Colciencias Scheme 2014-2015 Headed by Colciencias

Colombian Institution	UK Institution	Project Name
Universidad de Antioquia	King's College London	Effect of Large Scale Inhomogeneities on Cosmological Observations
Universidad Tecnológica de Pereira	University College London	Hilbert Space Embeddings of Autoregressive Processes

Headed by the British Council

Colombian Institution	UK Institution	Project Name
Universidad de Santander	University of Nottingham	Development and Evaluation of Encapsulated Bacterial Lactonases
Universidad de Los Andes	University of Bath	Preliminary Study for the Development of Regulations for the Design of Structural Elements in Laminated Guadua Bamboo
Universidad Pontificia Bolivariana	University of Nottingham	Modelling and Simulation of Flow in Anaerobic Digesters by Meshless Methods Based on RBF Collocation

British Council Scheme 2015-2016

Partner: Colciencias (Minciencias)

Colombian Institution	UK Institution	Project Title
Universidad de Cartagena	Loughborough University	Modelling and Optimization of Solar Photocatalytic Reactors Used for Environmental Applications
Universidad de Antioquia	Wellcome Trust Centre for Neuroimaging	Bayesian Inference on Functional Anatomy Applied to Ex-Combatants of the Armed Conflict in Colombia
Universidad de Antioquia	Heriot-Watt University	Evaluation of a Socio-Emotional Short Training Programme on the Modulation of Brain Connectivity Patterns in Ex-Combatants of the Colombian Armed Conflict
Pontificia Universidad Javeriana sede Cali	University of Essex	Economic Inequality and Social Polarization in the Colombian Post-Conflict: Policy Issues for Peacebuilding
Universidad Cooperativa de Colombia (UCC)	University of Southampton	BioWASTE to BioVALUE : Adding Value to Rural, Industrial and Domestic Waste for Sustainability Development in Colombia
Universidad Externado de Colombia	University of Dundee	The New Reality of Participation of Local Authorities in Mining Projects in Colombia: Interpretation of Constitutional Principles, New Opportunities and Participation Mechanisms
Universidad del Cauca	St Edmund's College	Transitional Justice in Colombia

British Council Scheme 2016-2017

Partner: Colciencias (Minciencias)

Colombian Institution	UK Institution	Project Name
Universidad Nacional de Colombia	Imperial College London	Integration of Bioenergy into the Urban Energy System of Bogotá
Universidad Nacional de Colombia	University College London (UCL)	The Relationship Between Oral Health and Different Socioeconomic Dimensions in Colombia
Universidad de los Andes	University of Surrey	The Exploration and Exploitation Balance in Dynamic Knowledge Transfer Networks: An Agent-Based Computational Approach and a Fieldwork Design of Knowledge Transfer in SMEs in Rural Colombia
Universidad del Rosario	SOAS-University of London	Coffee, Armed Conflicts, and War-to-Peace Transitions: The Case of Colombia
Universidad Militar Nueva Granada	University of Bristol	Assessment of Earthquake-Induced Liquefaction Potential of Soils Subjected to Rotation of Principal Stress Axes by Means of Advanced Laboratory Techniques

Universidad de Medellín	University of Leicester	Identification and Monitoring of Deforestation in the Pluvial Pacific Coast of Colombia
Universidad Nacional de Colombia sede Medellín	Heriot-Watt University	Multiscale Study of Flue Gas Injection in Mature Oil Reservoirs
Universidad EIA	De Montfort University	Intelligent System for Multispectral Aerial View Analysis to Support the Sustainability of Oil Palm Plantations at Small and Medium Scale in Colombia
Universidad de Antioquia	University of Surrey	Valorisation of Agro-Industrial Waste: A Bioelectrochemical System for Waste Degradation and Energy Recovery from Industrial Coffee Waste
Universidad EAFIT	Imperial College of Science, Technology and Medicine	An Optimization Approach to Improve the Environmental Performance of an Operating Supply Chain Under Uncertainty
Universidad de los Andes	London School of Economics and Political Science	Extractive Futurities in Colombia
Instituto Tecnológico Metropolitano	University of Birmingham	Polymers and Nanoparticles for Antimicrobial Applications

Corporation for Biological Research - Antioquia	Earlham Institute	A Network Biology Approach to Colombia's Agriculture: The Case of Brassica Crops
Universidad de los Andes	University of Reading	Colombian Foreign Policy in the Post-Conflict Era
Universidad de Antioquia	University of Glasgow	Earth Observation in Support of Sustainable Livestock Grazing Systems (EOiSS)
Universidad de la Sabana	University of Coventry	Territory Reconfiguration: Displacement in Tocancipá (Colombia)
Universidad Minuto de Dios	University of Middlesex	Universities as Drivers in the Support of Grassroots Social Innovations: A Case Study of Uniminuto University in Colombia
Universidad de Antioquia	University of Greenwich	Banking, Technology, and People: An Analysis of the First Cashless Society in Colombia
Universidad de Los Andes	Queen's University Belfast	Evaluation of Instruments to Assess Social Cohesion and Social Inclusion in Programs that Promote Physical Activity in Public Spaces

Appendix 3	Institutional Links

2014-2015 Call

Partners: Colombian Universities and Research Institutions

Colombian Institution	UK Institution	Project Name
Universidad Nacional de Colombia Sede Medellín	University of Edinburgh	Harnessing Innovation in City Development for Social Equity and Well-being - A Critical Proposal to Build on Medellin's Experience as a Model for Colombian Future Cities
Centro Internacional de Entrenamiento e Investigaciones Médicas (CIDEIM)	University of Glasgow	Linking the Power of Omic Technologies to Translational Research on Neglected Tropical Diseases
Universidad de los Andes	London School of Economics and Political Science	Drugs Production, Rural Development and the Search for Peace in Colombia
Universidad de los Andes	University of Exeter	Sustainable Supply Chain Management in the Colombian Agricultural Sector
Universidad Industrial de Santander (UIS)	University of Strathclyde	Novel Accelerators for Low-Cost Portable X-Ray Sources
Universidad de Los Andes	University of Manchester	CAFÉS (Coffee from Advanced Fermentation, Engineering & Sensing): Smart Sensing and Processing from 'Crop to Cup' to Increase the Sustainability of Smallholder Coffee Producers
Universidad Nacional de Colombia sede Medellín	Wellcome Trust Sanger Institute	Tools, Training and Networks to Reduce Malaria Burden in the Pacific Coast of Colombia

2015-2016 Call

Partners: Colombian Universities and Research Institutions

Colombian Institution	UK Institution	Project Name
Universidad de Cartagena	University of Manchester	Improving Local Management of Tropical Coastal Resources in the Face of Climate Change for Economic Wellbeing of Local and Vulnerable Communities
Universidad ICESI	University College London	Towards a Sustainable Bio-Economy in Colombia: Vinasse Valorisation and Bioprocessing
Universidad Tecnológica del Chocó Diego Luis Córdoba	University of Edinburgh	Land Use Planning Challenges: the Gentrification of the Historical Centre of Quibdó, Chocó (Colombia) and its Impact on the Sustainable Socio-Economic Production
Universidad del Valle	University of Nottingham	Improving Energy Efficiency of Coal Power Stations Located in the Colombian Pacific Region
Universidad Jorge Lozano Tadeo	Imperial College London	Energy for Development: Promoting Access to Renewable and Sustainable Energy in Chocó. A UK-Colombia Collaboration
Universidad Nacional de Colombia	Cranfield University	Development of an Optoelectronic Sensor Material for Landmine Detection
Corporación Colombiana de Investigación Agropecuaria	Aberystwyth University	Improving Competitiveness, Resilience and Sustainability of Dairy Production in the High Tropics of Colombia

Universidad Nacional de Colombia Sede Manizales	Newcastle University	Development of a Novel Hybrid Grey-Box Framework for Adaptive Design, Optimization and Control of Drinking Water Membrane Filtration Technology for Non-Interconnected Remote Areas
Centro Internacional de Agricultura Tropical (CIAT)	Institute of Development Studies	Policy Instruments and Public-Private Collaborations for Secure and Inclusive Rural Economies in Marginalised Communities in Post-Conflict Colombia
Universidad de Antioquia	University of Oxford	The Genetics of Baseline and Sensitised Pain Sensibility in Humans
Universidad de Antioquia	Edge Hill University	Dengue in Colombia: Investigating Insecticide Resistance Status of the Mosquito Vector in Order to Design Campaigns to Improve Disease Prevention and Control

Colombia Bio 2016-2017

Partner: Colciencias (Minciencias)

Colombian Institution	UK Institution	Project Name
Universidad de Antioquia	Queen Mary University of London	Sustainable Products from Biomass
Universidad Nacional de Colombia sede Palmira	University of Southampton	Development of a Bio-Refinery System for Organic Acid Production, Bioenergy Generation and Nutrient Recovery Using Fish Wastes from Tumaco, Colombia
Universidad de Los Andes	University of Bath	Water Monitoring in Colombian Vulnerable Communities in a Post-Conflict Scenario
Universidad de Antioquia	University of Sheffield	Applications of Biomaterials Based on Polysaccharides Derivatives of Marine Algae from Colombia
Universidad Industrial de Santander (UIS)	University of Warwick	Fingerprints Typification of Biofuel Samples by Ultra-High Resolution Mass Spectrometry Using an Ultra- High-Resolution Fourier Transform Ion Cyclotron Resonance Mass Spectrometer (FT-Icr Ms)
Universidad ICESI	University College London	Sustainable Biotransformation Process to Exploit Anaerobic Digestion Sludge
Corporación Corpogen	Edge Hill University	Identification of Natural Products from Colombian Actinomycetes: Understanding their Biosynthesis Towards the Discovery and Production of Novel Antimicrobials

Colombia Bio 2019-2020

Partner: Colciencias (Minciencias)

Colombian Institution	UK Institution	Project Name
Universidad Nacional de Colombia sede Bogotá	University of York	Development of Technologies for the Production of Valuable Biobased Fatty Esters from Agroindustrial Residual Streams
Agrosavia	Earlham Institute	Leverage Yellow Common Bean Native Variety Liborino as a Bioproduct for the Sustainable and Peaceful Socioeconomic Development of the Rural Communities in Colombia
Universidad Nacional de Colombia sede Bogotá	University of Bath	Enabling Colombian Perishable Agricultural Exportations via Smart Biopacking (ECoPack)
Universidad Pontificia Bolivariana	Queen Mary University of London	Bacterial Nanocellulose Obtained from Colombian Fique Plant Biomass Waste for Application in Energy Storage
Universidad Francisco de Paula Santander	University of Nottingham	Algalcolor: Bioplatform for the Sustainable Production of Cyanobacterial Based Colours and Fine Chemicals
Universidad de la Sabana	Imperial College London	Turning Residential and Industrial Waste into Affordable Energy through Dry Fermentation - Sabana Centro, Colombia
Centro de Bioinformática y Biología Computacional (BIOS)	NIAB	Kocolatl: A Bioeconomy System to Valorise Cacao Organic Waste into Valuable Products

Universidad Nacional de Colombia	University of York	Valorisation of Wastes from Coffee Supply Chain in Colombian and UK to Develop Novel Products
Universidad Industrial de Santander (UIS)	University of Sheffield	Integrated Anaerobic Digestion and Gasification Systems for Sustainable Farming in Colombia
Instituto de Capacitación e Investigación del Plástico y del Caucho (ICIPC)	University of Strathclyde	Upcycling Plastic Waste Reinforced by Modified Fique Fibre

Appendix 4	Professional Development & Engagement

Immersion into Financial Instruments Kingston University, London

Partner: iNNpulsa Colombia

2015

Open call for a two-week training program for the development of new financial instruments and financing mechanisms based on the experience of the United Kingdom government, private entities, equity funds, angel investor networks, among other parties that form the entrepreneurial ecosystems.

Selected Company	**City**
Consultoría de fondos de capital privado	Cali
Solidus Capital	Cali
Estratec	Bogotá
Marval S.A.	Bucaramanga
Ángel inversionista	Bogotá
Galvis Ramírez Cía S.A. y Promisión S.A.	Bucaramanga
Agencia de Marketing Deportivo	Cali

Selected Company	City
Empresa familiar	Bogotá
Astorga	Medellín
Manizales Más	Manizales
Orgánica	Cali
Quantum Media Fund Colombia	Bogotá
Credicorp Capital	Bogotá
Santander Inmobiliario	Bucaramanga
Ecopetrol	Bogotá
Ángel inversionista	Medellín

Program for the Formulation and Structuring of CTeI Projects under the General Royalty System

Partner: Colciencias (hoy Minciencias)

2015-2018

Phase 1	
5-module online course to strengthen the formulation and structuring of projects and face-to-face workshops. Creation of the https://redctei.minciencias.gov.co/ platform.	University of Reading
Sustainability workshops, network of science, technology and innovation project developers.	University of Reading
Creating technical diagnosis and guidance documents for CTeI project formulation and structuring in five areas: research and technology results transfer units, research centres, innovation centres, science centres (museums) and biological collections.	Bio Nano Consulting - Ruta N
Phase 2	
Formulation and structuring of specific CTeI projects, in the profile, pre-feasibility and feasibility phases of four pilot projects made for four departments of Colombia: Casanare, Huila, Quindío and Bolívar.	Bio Nano Consulting with the collaboration of CienTech

Palabrario & Numerario

Partners: Fundación Corona & Fundación Génesis

2017

Consulting and training by Think, Learn, Challenge (TLC) and CollaboratED to incorporate STEM skills to the Fundación Corona's Palabrario & Numerario program, which reaches more than 15 departments of Colombia, and benefits more than 372,000 children and 9,500 teachers. These activities benefited 21 schools (9 public and 12 private institutions with vulnerable populations), directly impacting 142 people and, indirectly, 44 educational institutions.

Capacity-Building in Public and Social Innovation for the Colombian Government

Partner: Departamento Nacional de Planeación

2017

This program was created at the National Planning Department's initiative to promote innovation within the government as a national priority, in order to efficiently and effectively achieve solutions to Colombia's social, economic, and environmental challenges. Nesta, a consulting firm based in the United Kingdom, was in charge of the technical assistance by designing, implementing and executing a series of specialised workshops for the DNP Public Innovation Team (EiP) and for Colombian public officials using innovative tools and methodologies, such as design thinking, systems analysis and behavioral sciences, which in turn would be applied in the design, implementation and evaluation of public policies, programs and services.

Bravo (Botanical Resources Available Online)

Partner: Colciencias (Minciencias)

2017-2019

Description	Project in charge of	Participants and collaborators
Development of www.colplanta.org, a free access platform that gathers high-quality taxonomic information on the more than 27,000 plant species in Colombia, as well as their traditional uses, sustainable practices, global maps of geographic distribution, conservation status, photos, genetic data and additional information on ecology and natural history. As a part of this project, there was also an internship program for young Colombian botanists at Kew Gardens.	Royal Botanic Gardens, Kew	Instituto Alexander von Humboldt, Jardín Botánico de Bogotá "José Celestino Mutis", Jardín Botánico de Cartagena "Guillermo Piñeres", Jardín Botánico de Medellín "Joaquín Antonio Uribe", Jardín Botánico del Quindío, Red Nacional de Jardines Botánicos, Universidad Nacional de Colombia, Universidad Pedagógica y Tecnológica de Colombia, Academia Colombiana de Ciencias Exactas Físicas y Naturales, Asociación Colombiana de Herbarios, Universidad de Antioquia, Universidad de la Amazonia, Universidad de Nariño, Universidad del Cauca, Universidad Distrital "Francisco José de Caldas", Universidad Tecnológica del Magdalena, Royal Botanic Garden Edinburgh and University of Leeds
Permanent monitoring of Colombian plots in order to address questions about how biodiversity changes over time, and how it contributes to the resilience of ecosystems in both nature and society in the face of global change. Information at ForestPlots.net and https://zenodo.org/communities/bravo	Royal Botanic Garden of Edinburgh	Universidad del Rosario, Universidad Tecnológica del Chocó, Universidad del Tolima, Universidad del Quindío, Universidad de Antioquia, Universidad de Los Andes (Orinoquia y Valle del Magdalena), Universidad Industrial Santander, Universidad Distrital, UAP-NN; Instituto Alexander von Humboldt, Jardín Botánico de Medellín, Universidad Caldas, Universidad del Norte, Universidad Distrital, Universidad de Los Llanos, Instituto Tecnológico de Cartagena, Universidad Nacional Abierta y a Distancia, ColTree, Royal Botanic Gardens, Kew

Usefuel Plants and Fungi of Colombia

Partner: Minciencias

2019-2022

Description	Project in charge of
This project sought means through which to improve nature's contribution to communities in Colombia. It did this by consolidating and increasing availability of knowledge about useful plants and fungi, as well as by developing a market for underutilized native species and their high-value products as a way to encourage the conservation of natural habitats.	Royal Botanic Gardens, Kew Instituto Alexander von Humboldt

Appendix 5

List of British Universities Selected by Scholarship Recipients from the PhD Program of the Minciencias Scheme

Host institution in the UK	Area of the doctoral scholarship
Imperial College London	Biology
King's College London	Institute of Latin American Studies
King's College London	Theology and Religious Studies
London School of Economics and Political Science	Development
Newcastle University	Agriculture, Environment and Sea
Newcastle University	Nanoscience
Newcastle University	School of Geography, Sociology and Politics
Queen Mary University of London	Computer Science
The University of Edinburgh	International Development
The University of Edinburgh	Architecture
The University of Manchester	Environmental Biology
The University of Manchester	Humanitarianism and Conflict Response
The University of Reading	Human Geography
UCL	Psychoanalytic Studies
University College London	Genetics, Evolution and Environment

Host institution in the UK	Area of the doctoral scholarship
University of Bath	Architecture and Civil Engineering
University of Birmingham	Biotechnology and Health
University of Bristol	EdD Education: Learning, Leadership and Policy
University of Bristol	Molecular Epidemiology, Genetics and Life Cycle
University of Bristol	Mechanical Engineering
University of Cambridge	Agriculture, Environment and Sea
University of Cambridge	Social Sciences and Education
University of Cambridge	Planning and Development Studies
University of Cambridge	Citizen Security (Criminology)
The University of Edinburgh	Engineering
University of Leeds	Civil Engineering
University of Leeds	Agriculture, Environment and Sea
University of Leicester	Social Sciences and Education
University of Leicester	Engineering
University of Leicester	Mathematics
University of Leicester	Bioengineering
University of Leicester	Landscape and Climate Research

Host institution in the UK	Area of the doctoral scholarship
University of Leicester	Modern Languages
University of Manchester	Agriculture, Environment and Sea
University of Nottingham	Social Sciences and Education
University of Nottingham	Engineering
University of Nottingham	Sustainable Energy Technologies
University of Nottingham	Economics
University of Oxford	Sociology
University of Oxford	Public Policy
University of Reading	Social Sciences and Education
University of Southampton	Human Development and Health
University of Southampton	Immunity and Infection
University of Southampton	Engineering and Environment
University of St Andrews	International Affairs
University of Warwick	Logistics-Graduate Research Engineering
University of Warwick	Theology and Religion
University of York	Social Sciences and Education
University of York	Environmental Economics and Environmental Management

Appendixes Brazil

Appendix 1

Researcher Links Workshops

2014-2015

Partner: CNPq

Brazilian Institution	UK Institution	Project Name
Universidade Federal do ABC (UFABC)	Glasgow Caledonian University	Water Environment Micropollutant Science Initiative: AGCU-UFABC-PUCPR Collaborative Effort to Explore Emergent Pollutants in Brazilian Watercourses.
Universidade Estadual de Campinas	King's College London	Sickle Cell Disease - Environmental and Genetic Factors Influencing Clinical Outcome
Universidade Estadual de Campinas	Heriot-Watt University	Rain, Rivers and Reservoirs
Universidade Federal de Minas Gerais	University of Sussex	Science, Technology and Innovation in Neglected Diseases: Policies, Funding and Knowledge Creation
Universidade Estadual Paulista Júlio de Mesquita Filho	Swansea University	Next Generation Sequencing Applications to Improve Livestock Welfare, Food Security and Socio-Economic Stability in Brazil
Universidade Federal de Santa Catarina (UFSC)	University of Reading	Understanding and Advancing Therapies for CNS Disorders
Fundação Getúlio Vargas	University of Northampton	Eco-food Supply Chains: Exploring Industrial Ecosystems to Minimize Food Waste and Maximize Social Benefits

2014-2015

Partner: FAPESP

UK Institution	Brazilian Institution	Project Name
University of Edinburgh	Universidade Federal de São Paulo	Water as the Frontier of Agribusiness: Politico-Ecological and Socio-Economic Connections from Farms to Global Markets
Bangor University	Universidade Federal de São Paulo	Global Change in Coastal Marine Ecosystems: Science, Policy and Sustainable Development
University of Aberdeen	Universidade Federal de São Carlos	Electrochemical Solutions for Contemporary Problems (ELSOL)
University of Cambridge, Metabolic Research Laboratories - Medical Research Council, Metabolic Diseases Unit	Instituto de Ciências Biomédicas da Universidade de São Paulo	Mechanisms Underlying Developmental Programming of Metabolic Disease - Insight into Prevention Strategies
University of Bath	Universidade de São Paulo	Sport and Social Transformation in Brazil
University of Northampton	Universidade Federal de São Carlos	Becoming Visible: Comparing Inclusive and Special Education Policies, Practices and Research in Brazil and the UK
Aberystwyth University	Universidade de São Paulo	Using Systems and Synthetic Biology to Tailor Plant Cell Walls for a Better Future

UK Institution	Brazilian Institution	Project Name
University of Aberdeen	Universidade de São Paulo	Integrative Research: Challenges of Complex Systems for Technological Applications
University of Brighton	CETESB	New Approaches to Monitoring and Managing Waterborne Disease Transmission in Brazil and the UK
University of Cambridge	Universidade Estadual de Campinas	Advances in Plant Growth and Development
The University of Manchester	Universidade de São Paulo	Modelling-Aided Design to Support Vehicle Crashworthiness and Vehicle Safety Harmonization
Manchester Business School	Instituto de Geociências, USP	Innovation Systems and Policy Mix Towards Multidimensional Development
The University of Surrey	Universidade de São Paulo	A "One Health-One Welfare" Approach to Animal and Human Well-Being in Diverse Urban, Peri-Urban and Rural Communities in São Paulo
University of Nottingham	Universidade de São Paulo	Qualitative Study Design in Healthcare-Associated Infection Research
University of York	Universidade Estadual de Campinas	The New Historical Linguistics and the World of Annotated Corpora
Aston University	Universidade de São Paulo	Research Excellence and International Collaboration

2016-2017

Partner: CNPq

Brazilian Institution	UK Institution	Project Name
Universidade Federal do Rio Grande do Sul (UFRGS)	University of Huddersfield	Managing Complex Social Housing Urban Redevelopment through Improved Project Management and Value Generation
Universidade Federal de São Paulo (UNIFESP)	University of Birmingham	Ageing and Health- How to Get There?
Universidade Federal de Santa Catarina	Queen's University Belfast	Social Technology Solutions to Postnatal Health Care in Brazil
Faculdade Meridional	Queen's University Belfast	Developing Legal Research Networks around Agri-Technology in Brazil and the UK
Universidade Federal de Minas Gerais	University of Bristol	Urban Dialogues: Creating Inclusive Urban Spaces in Uncertain Global Times
Universidade Federal de Santa Catarina	Coventry University Faculty of Engineering and Computing	Community-Based Sustainable Energy: Combining Wireless Systems, Smart Micro-Generation and Education
Universidade Federal de Alagoas	University of Warwick	Higher Education for All: International Workshop on Social, Semantic, Adaptive and Gamification Techniques and Technologies for Distance Learning
Universidade Federal do Paraná	Oliver Zangwill Centre for Neuropsychological Rehabilitation	Neuropsychological Rehabilitation (NpR) of People with Acquired Brain Injury (ABI): Creating a Multicultural Research Network on Interdisciplinary Service
Universidade de São Paulo	Aston University	Enhancing Relevance and Impact in Brazil for Research in Green Technology Management & Product-Service Systems

Brazilian Institution	UK Institution	Project Name
Universidade Federal de Minas Gerais	Research Department of Epidemiology & Public Health	Indicators for a Healthy City: A Brazil-UK Knowledge Sharing Researcher Workshop
Universidade Federal do Amazonas	Swansea University	Supporting Sustainable Ecosystems for Poverty Alleviation in the Amazon
Universidade Federal do Rio Grande do Sul	University of Nottingham	Pavements for Energy Harvesting and Dependable Low-Volume Roads
Universidade de Brasília	University of Northumbria at Newcastle	Climate and Landscape Change in the Pantanal: Assessing Environmental Vulnerabilities and Future Water Security in Brazil's Wetland Wilderness
Universidade de Brasília	Cardiff University	Environmental Governance for Sustainable Urban Transformation: Exploring Opportunities for Knowledge Exchange and Comparative Research on Socio-Environmental Conflicts and their Regulation
Universidade de Brasília	University of Glasgow	Pathways to Social and Economic Welfare: Considering Affirmative Action Policies in Brazil
Instituto Federal de Goiás (IFG)	University College London	Water, Sanitation and Energy Nexus Research Initiative
Universidade Estadual Paulista (UNESP)	The Roslin Institute and R(D)SVS, University of Edinburgh College of Medicine and Veterinary Medicine	Methods, Strategies and Tools to Generate, Analyse and Incorporate genomic Data into Livestock Breeding Programs
Universidade Federal de Goiás	University of Strathclyde	The Expansion of New Frontiers for Renewable Energy: Effects, Conflicts and Alternatives for Populations of Socio-Environmental Vulnerability

2018-2019

Partner: CONFAP/FAPESP

Brazilian Institution	UK Institution	Project Name
Universidade Estadual de Campinas	London School of Economics and Political Science (LSE)	Governance, Crime and International Security: Testing Innovations in Policy, Practice and Research
Universidade Estadual de Campinas	University of Sheffield	Migration, Trafficking, Sex Work, and the Law: the Case of Brazil
Universidade Estadual Paulista	Queen's University Belfast	Developing Sustainable International Partnerships for Cost-Effective Evidence Based Education and Social Innovation in Brazil
Universidade de Brasília	University of Manchester	Rethinking the 'Green' City: Contributions to Environmental and Socio-Cultural Interpretations of Urban Development
Universidade Estadual de Campinas	University London	Workshop on Bio-Photonics For Neglected Diseases
Fundação Getúlio Vargas	University of Manchester	Global Value Chains and Agenda 2030
Universidade de São Paulo (FEA-USP)	University of York	UN's Sustainable Development Goals (SDGs): International Academic Collaboration for Transformational Industry and its Social and Environmental Impacts

Brazilian Institution	UK Institution	Project Name
Universidade de São Paulo	University of Leeds	Impact of Gunshot Wounds on Muscle Regeneration
Universidade de Brasília	Leeds Beckett University	Higher Education and Societal Transformation: Decolonization and Racial Equality
Universidade Federal do ABC	University of East Anglia	Urban Water Security in Brazil: From Infrastructure to Social Action
Universidade Estadual do Oeste do Paraná	University of York	UK-Brazil Workshop on Financing Urban Climate-Resilient Development
Universidade Estadual de Campinas	Cardiff University (Prifysgol Caerdydd)	Environment and Development: Shared 21st Century Sustainability Challenges
Universidade Federal do Espírito Santo	Bournemouth University	Ecosystem-Based Management of Estuaries and Coasts to Support Coastal Adaptation
Universidade Federal de Juiz de Fora	Coventry University	Organized Crime and the Criminal Justice System in the Age of Globalization: Challenges for Brazil and the United Kingdom

2019-2020

Partner: CONFAP/FAPESP

Brazilian Institution	UK Institution	Project Name
Universidade Federal do Espírito Santo	Coventry University	Transforming Trajectories of Vulnerability: Re-Examining Educational Achievement (2TV)
Universidade de São Paulo	University of East Anglia	Corpus Linguistics & Education Research for Development: Building Research Capacity in an International Landscape
Universidade Federal de São Carlos	Manchester Metropolitan University	Towards Healthy Brazil: Sustainable Urban Nexus (Water-Energy-Sanitation) in the Tiete River Basin
Centro de Pesquisa da Universidade Positivo	Coventry University	Workshop on the Identification, Development and Diffusion of Pathways to Accelerated Decarbonisation of Road Transport
Universidade Estadual de Campinas	Cardiff University (Prifysgol Caerdydd)	Sustainable Chemical Approaches for CO_2 Reduction
Universidade de São Paulo	Cardiff University (Prifysgol Caerdydd)	Precarious Work, Precarious Life: Unemployment and Precarious Work in the Context of Neoliberalism and Precarity of Life

Appendix 2

Institutional Links

2014-2015

Partner: SEBRAE

Brazilian Institution	UK Institution	Project Name
Universidade Federal de Alagoas (UFAL)	University of Nottingham	Structure and Function of Odorant Binding Proteins from *Helicoverpa Armigera*
Universidade Federal de Vicosa	Institute of Biological, Environmental and Rural Sciences	Discovery of Novel Antimicrobials from the Rumen Microbiota for Animal and Human Health
Centro Nacional de Pesquisa em Energia e Materiais (CNPEM)	University of Nottingham	TRANSTAR: A Transatlantic Target-Based Drug Discovery Platform
Fundação Getúlio Vargas	International Institute for Environment and Development	Knowledge Hub on Adaptation to Climate Change in Brazil
Instituto de Ciências Biomédicas da Universidade de São Paulo	The Pirbright Institute	Preparedness for Novel Virus Emergence from Wild Birds and Bats: Metagenomics-Driven Viromes and Understanding Innate Immunity
Universidade Federal de Viçosa	Institute of Biological and Rural Sciences, Aberystwyth University	Using Systems Biology to Improve Feed Conversion Efficiency, Lower the Environmental Impact and Increase the Profitability of Beef Production

2016-2017

Partner: CONFAP/FAPESP

Brazilian Institution	UK Institution	Project Name
Universidade do Estado do Amazonas (UEA)	London School of Economics and Political Science (LSE)	Participatory Approaches to Natural Resource Conservation in the Brazilian Amazon
Universidade Federal do Amazonas	Coventry University	Sustainable and Replicable Off-Grid Renewable Energy System for Riverside Communities in the Amazon, Brazil (STAR Energy)
Universidade de São Paulo	University of Oxford	State Violence in Brazil: A Study of Crimes of May 2006 in the Perspective of the Transitional Justice and Forensic Anthropology

2017-2018

Partner: FIOCRUZ

Brazilian Institution	UK Institution	Project Name
Universidade Federal de Alagoas	Newcastle University	Leveraging Gamification and Social Networks for Improving Prevention and Control of Zika
Programa de Pós-graduação em Ecologia e Conservação	University of Leeds	Amazon Resilience at the Forest Transition (AM-TRAN)
Programa de Pós-graduação em Biologia Vegetal	University of Aberdeen	Advancing Equity in Brazilian Protected Area Management
Diretoria Regional de Brasília	London School of Hygiene & Tropical Medicine	Supporting Health Professionals to Provide Care to Families of Children with Congenital Syndromes Related to Zika Virus in Brazil
Fiocruz Minas Gerais	University of York	Women's Social Movements and the Response to Zika and Microcephaly in Brazil: Addressing Neglect through Community-Centred Approaches
Universidade Federal de Pernambuco (UFPE)	University College London - UCL	A Gamified M-Training App for Health Professionals on Protocols and Participatory Surveillance Associated with Zika Virus
Universidade Federal de Pernambuco	Institute of Development Studies	Building Collaboration for Action Ethnography on Care, Disability and Health Policy and Administration of Public Service for Women and Caretakers of Zika Virus Affected Children in Pernambuco, Brazil
Fundação Oswaldo Cruz, Escola Nacional de Saúde Pública Sergio Arouca	Coventry University	Modelling and Mapping Statistical Probabilities; Correlation between Zika Virus Transmission, Sanitary and Drainage Conditions in the Metropolitan Area of Fortaleza/Ceará (Brazil)
Fundação Oswaldo Cruz	University of Oxford	Acting in an Uncertain World: Mapping Public Health Responses to the Zika Epidemic in Brazil

2018-2019

Partner: FIOCRUZ

Brazilian Institution	UK Institution	Project Name
Universidade Federal do Pará	The University of Salford	Prawns, Shrimp & Co. Demand, Supply and Food Security of Crustaceans in North Eastern Pará, Brazil: Current Status, Challenges and Future Directions
Universidade Federal de Santa Catarina	Bournemouth University	Veg+: Increasing Vegetable Consumption for Young Adults through Short Food Supply Chains
Instituto Federal de Goiás (IFG)	University College London (UCL)	A Water-Waste-Energy-Food Model for Rural Communities and Organic Farming Sustainability in Brazil
Fundação Oswaldo Cruz	London School of Hygiene & Tropical Medicine	Estimating the Public Health Burden of Arbovirus-Related Complications in Brazil: A Population-Based Big Data Project
Escola Nacional de Saúde Pública Sergio Arouca	University of London	Prevalence and Risk Factors for Postpartum Depression and Post-Traumatic Stress Disorder in Brazil

Appendix 3

Professional Development & Engagement

STEM

Partner: CAPES

2014-2015

Workshop Aimed At Co-financing Training and Skill Development Projects in Partnership with British Institutions.

Instructor Formation Course for Nesta Training for Creative Entrepreneurs and Multiplication for Creative Entrepreneurs from the Peripheral Regions of the City of São Paulo

Partner: ADESAMPA

2015-2016

The goal is to promote the implementation of local development policies, especially those which contribute to economic growth, the attraction of investment, a reduction in regional inequality, while leveraging economic competitiveness, the generation of jobs and income, entrepreneurism, solidarity economics and technological innovation.

Psychological Reparation Centres

Partner: ISER

2015-2016

Brazilian Institution	UK Institution
Instituto de Estudos da Religião - ISER	London School of Economics and Political Sciences - Department of Psychological and Behavioral Science
Instituto APPOA	International Centre for Health and Human Rights - ICHHR

Institutional Skills

Partner: SEBRAE

2015

A Workshop Aimed At Co-financing Training and Skill Development Projects in Partnership with British Institutions.

Brazilian Institution	UK Institution	Project Name
AdeSampa	The Studio - Loughborough University	Made in Sampa: Accelerating Creative and Cultural Business from Vulnerable Regions of São Paulo
Fundação Amazonas Sustentável	Global Canopy Programme	Developing Business Skills for a Thriving Inclusive Economy and Forest Conservation in the Amazon
Associação Habitat para Humanidade Brasil	Action Aid UK	Strengthening Skills for Fairer Cities
Associação RedSOLARE Brasil	Sightlines Initiative	Learning in Nature: Developing an Environment of Enquiry - Bahia, Brazil
Centro de Assessoria Multiprofissional (CAMP)	Christian Aid	Project the Solidarity Economy in South of Brazil
Museu do Samba (Centro Cultural Cartola)	Research Centre for Museums and Galleries (RCMG), University of Leicester	Training in Audience and Visitor Research Methodologies: Developing a Socially Responsible Museum
Fundo de Aceleração Para o Desenvolvimento Vela (FA.VELA)	Centre for Industrial Sustainability, University Of CAMBRIDGE	Resilient Fa.Vela

Brazilian Institution	UK Institution	Project Name
Instituto Asta	TIE - The International Exchange	School of Artisans
Instituto SUSTENTAR Interdisciplinar de Estudos e Pesquisas em Sustentabilidade	University of Leeds	Critical Stakeholder Training on Assessing the Potential for Solidary Selective Collection and Inclusive Recycling of Solid Waste
Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS)	Tyne & Wear Archives & Museums (TWAM)	The Use of Museum's Scientific Collections for Teaching Evolution and Understanding of
Visão Mundial Brasil	Kingston University	Mulheres Empreendedoras - Mãos na Massa
TransLAB Instituto de Pesquisa em Inovação Social	Brunel University	City Visionaries Edition Jovem Aprendiz
Cidade Escola Aprendiz Association	London School of Economics and Political Science	Training Program in Public Policy and Intersectoriality
Instituto Brasileiro de Estudos e Apoio Comunitário (IBEAC)	School for Social Entrepreneurs (SSE)	Sowings of Rights, Harvesting Cambuci and Açai

Master's Scholarships for Underrepresented Groups to Increase their Participation in Science as Well as Supporting the Science and Innovation Environment in Brazil

Partner: FAPEG/FAPESB/FAPESQ-PB

2017-2018

The project seeks to offer master's scholarships for underrepresented groups, seeking their inclusion in the science, innovation and technology sector in Brazil. The project offers 12 scholarships.

Creative Economy

Partner: SEBRAE

2017-2018

This project seeks to access expertise and leadership in the UK creative economy sector to benefit participants in Brazil. The aim of this project is to provide the participants with expertise and confidence, enabling them to train and mentor creative entrepreneurs (or potential creative entrepreneurs) from marginalised territories.

Soluções para o Desenvolvimento Sustentável, Grã-Bretanha e Amazonas

Partner: Fundação Amazonas Sustentável

2017-2018

Workshop aimed at building synergy between British and Amazonian researchers.

Brazilian Institution	UK Institution
Fundação Amazonas Sustentável	Chancellor of the Exchequer, George Osborne

Appendix 4

Researcher Connect

2014-2015

Partner: Universidade Estadual do Norte do Paraná

Brazilian Institution

TaraWorks Ltd.

BNDmand

Glory Consults Ltd.

World-Wide Higher Education Consultancy

BNDmand

Anthroscape

Daniela Bultoc

BNDmand

2015-2016

Partner: CONFAP/ FAPESP

Brazilian Institution

Dialogue Matters

Grant Craft

Stellar Consultancy

WRG Europe Ltd.

2018-2019

Partner: CONFAP/ FAPESP

Brazilian Institution
FCEPE
FAPEAM
PAPEG
PAPEMA
FAPEMIG
FAPEPI
FAPES
FAPESB
FAPES
FAPESQ
FAPT
Fundação Araucária

Appendix 5

Newton Fund Impact Scheme

2019-2020

Partner: Fundação Araucária/FAPEAM/SOF

Brazilian Institution	UK Institution	Project Name
Serviço Geológico do Brasil (SGB)	Queen's University Belfast (QUB)	Supporting Sustainable Groundwater Supply Management in Brazil
Universidade Federal do Amazonas	London School of Economics and Political Science (LSE)	Electrifying the Amazon: The Impacts of Access to Renewable Energy in Riverine Communities
Universidade Federal do Amazonas	University of Leeds	Visualising and Enhancing Value Chains in the Amazon - Realising Impact and Promoting Partnerships
SOF Serviço de Orientação da Familia	Christian Aid	Strengthening Rural Women's Agro-ecosystems and Networks to Build Alternatives to Poverty and Vulnerability in Brazil

Appendix Mexico

Appendix 1

Researcher Links Workshops

2014-2015

Partner: CONACYT

Mexican Institution	UK Institution	Project Name
Instituto Mexicano del Petróleo	University of Surrey	Biorefinery Research-Promoting International Collaboration for Innovative and Sustainable Solutions
IPN	University of Derby	Managing Business Excellence and Adapting Innovation Systems for Supporting a Sustainable Transition Towards a Low Carbon Economy
CENTRO-Diseño, Arte, Televisión	Birmingham City University	*In Terra Incognita:* Innovation for Entrepreneurship, Great Britain-Mexico
IMSS	University of Oxford	Genome Research and Human Health: Current Applications and Translational Potential in Inflammation and Infectious Diseases
Centro de Investigación y Asistencia Técnica del Estado de Querétaro	Newcastle University	Advanced Digital Manufacturing for Industrial Development Workshop. From Aerospace to Bio-Printing
Centro de Investigación en Matemáticas	University of Strathclyde	MultiplexCity: Towards a Holistic Data Analytics for Future Cities
Escuela Nacional de Estudios Superiores UNAM-Unidad León	University of Dundee / James Hutton Institute	Genomics Research on Plant-Parasite Interactions to Increase Food Production

Mexican Institution	UK Institution	Project Name
Instituto Nacional de Salud Pública	London School of Hygiene & Tropical Medicine	Towards Comprehensive Evaluation for Health and Development: Promoting the Integration of Evaluation Methods
Tecnológico de Monterrey-Campus Monterrey	University of Hull	Educational Dialogue and Transformative Learning in STEM Subjects in Mexico and the UK
Tecnológico de Monterrey-Campus Monterrey	University of Wolverhampton	Workshop: Training Directed to Researches with Interest in Science and Mathematics Education
Tecnológico de Monterrey-Campus Querétaro	University of Southampton	Workshop: Training Aimed at Researchers Interested in Teaching Science and Mathematics
Tecnológico de Monterrey-Campus Querétaro	University of Southampton	Intelligent Disaster Management

2015 -2016

Partner: CONACYT

Mexican Institution	UK Institution	Project Name
CIESAS, CDMX	University College London	Critical Medical Anthropology: Making it Work for Policy, Wellbeing and Welfare for Indigenous Communities
CINVESTAV	University of Strathclyde	Numerical and Evolutionary Optimisation for Future Cities
Universidad La Salle, A.C.	University of Edinburgh	Producing and Contesting Urban Marginality: Speculation, Public Space and Social Movements in the Neoliberal City
Universidad Michoacana de San Nicolás de Hidalgo	University of Sheffield	Seismic Risk Assessment and Mitigation Strategies for Existing Buildings and Structures
Colegio de Postgraduados, Campus Puebla	The James Hutton Institute	Economic Development and Social Welfare under Pressure: Climate Change Impacts on Water Resources
Universidad Autónoma de Querétaro	Bangor University	New Methods for Trace Evidence in Forensic Acarology and Human Taphonomy to Find Human Corpses, Age them, Follow their Translocation and Identify Scenes of Crime
CINVESTAV-Mérida	University of Nottingham	H2C (from Hot to Cold) Sustainable Energy in Contemporary Societies: Technical, Environmental and Social Considerations under a Global Economy

2016 -2017

Partner: CONACYT

Mexican Institution	UK Institution	Project Name
IPN-Unidad Profesional Interdisciplinaria de Biotecnología (IPN-UPIBI)	University College London	Phytomedical Compounds for Diabetes and Diabetes-Related Complications (DRC) - PHYDIMED
UNAM	University of Edinburgh	Mitigating Emerging Infection Challenges for Public Security and Justice
Instituto de Investigaciones Jurídicas (IIJ, UNAM)	Queen Mary, University of London	Intellectual Property for Social Enterprising. Solving Social Problems through University innovation
Centro Mario Molina para Estudios Estratégicos sobre Energía y Medio Ambiente	University of York	Improving Assessment of Air Pollution in Mexican Cities
Universidad de Guanajuato	University of Manchester	Biotechnology and Glycobiology Tools for Human Health
UNAM-Facultad de Medicina Veterinaria y Zootecnia	University of Edinburgh	The Potential of Genomics on Animal Production and Health Research to Promote Food Security, Reduce Food Poverty and Mitigate the Environmental Impact
UNAM	British Geological Survey (BGS)	Enhancing Regional Water Security in Semi-Arid Regions through Improved Metropolitan Design
Tecnológico de Monterrey-Campus Quintana Roo	Loughborough University	Gender Issues in STEM Education
Instituto Tecnológico Superior de Felipe Carrillo Puerto	University of Bristol	Present Status and Horizon Scanning of Sustainable Aquatic Resource Development in Mexico

2017 -2018

Partner: REDNACECYT

Mexican University	UK University	Project Name
Centro del Cambio Global y la Sustentabilidad en el Sureste (CCGSS) y UNAM	University College London	Maintaining Biodiversity and Ecosystem Services for Sustainable Development under a Changing Climate

Appendix 2

Researcher Links Travel Grants

2014-2015

Partner: CONACYT

Mexican Institution	UK Institution	Project Name
El Colegio de la Frontera Sur (ECOSUR)	The James Hutton Institute	Risks and Opportunities of Applying an Ecosystem Services-Based Approach to Water Resources-Decision Making: A Clash of Worldviews?
Tecnológico de Monterrey-Campus Ciudad de México	University of Oxford	Assessment of Cellular Immune Responses against Dengue in Patients Infected with Dengue Virus: Towards a Vaccine Development
UNAM	Newcastle University, NU	Development and Commercialisation of Microalgae Technologies for Energy Production, Wastewater Treatment and CO_2 Capture
Tecnológico de Monterrey-Campus Ciudad de México	University of Oxford	Setting Up an HLA Typing Facility Using the State of the Art Techniques and Contribute to the Assessment of Celluar Responses against Infectious Diseases
Universidad de las Américas Puebla	University of Bristol	Investigating the Teaching and Learning of Mathematics, in Particular, Algebra, through the Characterisation of Classroom Cultures in Different Contexts
Instituto Tecnológico Superior de Acayucan	University of Reading	Hypotensive and Hypoglycemic Peptides Released from Whey by Lactic Fermentation Performed by Novel Strains Isolated from Dairies in Southern Veracruz, Mexico

2017 -2018

Partner: REDNACECYT

Mexican Institution	UK Institution	Project Name
El Colegio de la Frontera Sur (ECOSUR)	University of St Andrews	Managing Cattle Ranching and Biodiversity Conservation Conflicts in Latin America: Decision-Making Processes to Reconcile Paradoxical Local and Global Goals
CINVESTAV	The Open University	Measuring Carbon Flows in Mangrove Ecosystems: Importance and vulnerability
UAM	University of East Anglia	Conservation and Sustainable Management of Biodiversity and Ecosystem Services in Peri-Urban Areas of Mexico

Appendix 3

Institutional Links

2014-2015

Partner: CONACYT

Mexican Institution	UK Institution	Project Name
Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias	University of Greenwich	Research and Innovation for the Production and Use of Non-Toxic Jatropha in Dry Tropic Climate
Tecnológico de Monterrey-Campus Ciudad de México	University of Oxford	A Study of Cellular Immune Responses in Humans against Dengue Virus (DENV) to Inform a Novel Vaccine Development
Universidad de Colima	Anglia Ruskin University	Technological Platform for the Self-Management of Health and Diseases through Mobile Devices
Universidad de Colima	Loughborough University	Massive Multiple Input Multiple Output (MIMO) in Vehicular Ad Hoc Networks (VANETs)
Universidad Michoacana de San Nicolás de Hidalgo	University of Stirling	Genetic Management of Mexican Tilapia Germplasm

Mexican Institution	UK Institution	Project Name
Instituto de Investigaciones Eléctricas	University of Sheffield	UK-MEX Carbon Capture Utilization and Storage Research and Development Program for the Energy Sector
Centro de Investigación y Asistencia Técnica del Estado de Querétaro	Cranfield University	Consorcio bilateral para el tratamiento de aguas residuales “Eliminación de iones metálicos: síntesis, caracterización y evaluación de membranas poliméricas”
Instituto Nacional de Ecología (INECOL)	ISIS Innovation Limited	Formation of a Bi-National Working Group Mexico-UK for the Design of Research and Innovation Strategies that Promote Sustainable Development in Central Veracruz, Mexico
UNAM	University of Oxford	Regional Climate Projections Initiative Mexico-United Kingdom
Universidad Juárez Autónoma de Tabasco	Cranfield University	Bilateral Consortium for Wastewater Treatment "Elimination of Metallic Ions: Synthesis, Characterisation and Evaluation of Polymeric Membranes"

2016-2017

Partner: CONACYT

Mexican Institution	UK Institution	Project Name
Universidad Autónoma de Aguascalientes (UAA)	University of Derby (UoD)	Developing Food Security and Water Conservation for Economic Growth in Mexico - A Smart Monitoring and Control System (SMCS) Agro-Technology for Sustainable and Efficient Farming Operations
CINVESTAV	University of Leeds	Wireless Sensor Networks for Real-Time Monitoring of Water Quality
Universidad Autónoma Metropolitana-Iztapalapa	University of Leeds	Fermentation processes with CO_2-based solvents (FCO2Sol)
Instituto Nacional de Ecología (INECOL)	University of Nottingham	Valuable Wetlands- Mapping of Wetland Ecosystem Services for Climate Regulation
UNAM-Facultad de Medicina Veterinaria y Zootecnia	Animal and Plant Health	Characterization of the Immune Response of Zebu and Holstein-Friesian Cattle in a Model of Vaccination against Tuberculosis and its Association with Natural Resistance to *Mycobacterium Bovis.*
IPN	University College London	Automatic Control for Optimization of the Ozonation Regime in the Treatment of Contaminated Soil and Aquifers

Mexican Institution	UK Institution	Project Name
UNAM-Facultad de Medicina	Royal Holloway University of London	Development of Multiplex Probe Amplification (MPA) Technology for the Rapid, Sensitive and Specific Diagnosis of Invasive Human Candidiasis: A UK-Mexico Collaboration (MM-CANINV acronym)
UNAM	Newcastle University, NU	Novel Pilot-Scale System for Wastewater/Leachates Treatment and Carbon Dioxide Capture Using Microalgae and Ozoflotation (ATZINTLI)
Universidad Michoacana de San Nicolás de Hidalgo	The University of Reading	Valorization of Fish from Adolfo Lopez Mateos Reservoir in Mexico by Production of Bioactive Peptides and Bioactive Lipids
Tecnológico Nacional de México / Instituto Tecnológico de Morelia	The University of Manchester	Agricultural Application of Electrical Impedance Tomography (EIT) and Internet of Things (IoT) for Optimisation of Irrigation Water Resources
Centro de Investigación en Materiales Avanzados	Teesside University	Integrative Approach for Development of Nanocellulose-Based Sorbents Derived from Sustainable Biosources for Optimised Industrial Wastewater Treatment
Instituto Tecnológico y de Estudios Superiores de Monterrey-Campus Monterrey	University of Nottingham	Desarrollo de implantes intervertebrales asistidos por corte robótico de hueso (DIROBONE)
Centro de Investigación Científica de Yucatán (CICY)	The University of Manchester	Development of Sustainable Lightweight and Energy-Efficient Materials for Multi-Functional Structural Applications

2017-2018

Partner: SENER

Mexican Institution	UK Institution	Project Name
El Colegio de la Frontera Sur (ECOSUR)	University of Strathclyde	Marine Energy Satisfying Electrical Demand and Promoting Economic Growth in Local Communities Surrounding the Cozumel Channel
UNAM	University College London	Energy Epidemiology: Understanding the Relationship Between Gender and Energy Use and Efficiency Co-Benefits
Universidad Tecnológica de Jalisco	University of Nottingham	Coupling the Biochemical and Thermochemical Biorefinery Platforms for Gaseous Biofuels Production from *Agave Tequilana Bagasse*: A Novel Approach to Improve the Energy Efficiency in Tequila Industries
Instituto Nacional de Electricidad y Energías Limpias	University of Birmingham	Energy Storage Prioritisation Assessment for Mexico
Universidad Autónoma de San Luis Potosí	Cardiff University	Entrepreneuring Dynamic Self-Organized Interfaces to Convert Light into Products
CINVESTAV-Mérida	Swansea University	Screen-Printed Photovoltaics: Development of Low-Cost Processing Methods in Collaboration with Mexican Companies

2018-2019

Partner: British Council

Mexican Institution	UK Institution	Project Name
Instituto Nacional de Medicina Genómica	The University of Leicester	Implementation of Liquid Biopsy Testing for Management of Breast Cancer in Mexico
UNAM	The University of Reading	Application of Numerical Weather Prediction for Wind Power Resource Assessment in Mexico
Hospital Infantil de México-Federico Gómez	Oxford Brookes University	Criticality Analysis of Diabetic Gait in Children (CARDIGAN)
Instituto Tecnológico y de Estudios Superiores de Monterrey-Campus Ciudad de México	University of University of Glasgow	Networks, Innovation and Internationalisation of Mexican SMEs
Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE)	University of St Andrews	Organic Light Emitting Devices (OLED) for Treatment of Fungal Infections
Universidad Iberoamericana-Puebla	University of Edinburgh	Developing Collaborative Smart City Solutions to Manage Adaptation and Monitoring Climate Change Related Risks in Mexico

2019-2020

Partner: INAPI

Mexican Institution	UK Institution	Project Name
Universidad Autónoma Intercultural de Sinaloa	University of Nottingham	Mezquite: a Means to Improving Sustainable Social, Cultural and Economic Welfare in Arid and Semi-Arid Zones of Sinaloa, Mexico
Universidad Autónoma de Occidente	Aston University	System for Evacuation and Intermodal Relief Logistics During Climate-Related Events
Centro de Investigación en Alimentación y Desarrollo	Centre for Environment, Fisheries, and Aquaculture Science	Development of Sequencing-Based Analytical Tools for Strengthening Food Safety Programs in Sinaloa, Mexico

2019-2020

Partner: SECTEI

Mexican Institution	UK Institution	Project Name
UAM	British Geological Survey	Adaptation and Socio-Hydrological Resilience in the Peri-Urban Environment of Mexico City: Artificial Wetlands
UNAM	Newcastle University	Mexico City and Newcastle Partnership on Health and Air Pollution Research and Engagement (MANAPRE)
UNAM	Robert Gordon University	Syscardio-Intelligent System for Assisted Medical Diagnosis for Cardiovascular Diseases

2020-2021

Partner: CITNOVA

Mexican Institution	UK Institution	Project Name
Centro de Investigación en Alimentación y Desarrollo (Campus CIDEA)	University of Leeds	Safeguarding Milpa-Polyculture System for the Development of Sustainable Agricultural Practices and Functional Foods: a Bioeconomics Approach
Universidad Politécnica de Francisco I. Madero	The University Court of the University of Aberdeen	Exploitation of Mezquite Tree (*Prosopis laevigata*) as a Sustainable Source of Food with High Nutritional and Economical Value in the Mezquital Valley, Hidalgo Mexico

2020-2021

Patner: COPOCYT

Mexican Institution	UK Institution	Project Name
Instituto Tecnológico de San Luis Potosí	De Montfort University	Measuring Energy Poverty and its Health Impacts on Selected Indigenous Communities in the State of San Luis Potosi, Mexico, While Developing Public Policy to Promote Renewable Energy
Instituto Potosino de Investigación Científica y Tecnológica (IPICYT)	University of Nottingham	Sustainable Land Use Practices for Mexican Drylands: Phase 1. A Multi Stakeholder Assessment of the Nexus Livestock Production, Ecosystem Services and Climate Change
Instituto Potosino de Investigación Científica y Tecnológica (IPICYT)	Royal Botanic Gardens (RBG Kew)	Milpa 2030: Local Farming and Local Produce for Urban and Rural Food and Water Security in a Hotter, Drier Future
Instituto Potosino de Investigación Científica y Tecnológica (IPICYT)	Heriot-Watt University	Capacity Development through Institutional Linkage for a Green and Sustainable Arsenic Remediation Process for Safe Food and Water Provision in San Luis Potosi
Tecnológico de Monterrey-Campus Quintana Roo	Loughborough University	Gender Issues in STEM Education
Instituto Tecnológico Superior de Felipe Carrillo Puerto	University of Bristol	Present Status and Horizon Scanning of Sustainable Aquatic Resource Development in Mexico

Appendix 4

Professional Development & Engagement

Strategic Research Skills for Regional Development in Sonora State

Partner: COECYT

2016- 2017

Project and Finance Management Training for Researchers in Sonora State with a Focus on Climate Change

Training for Social Entrepreneurs

Partner: INADEM

2016 - 2017

Workshop and Toolkit for Policymakers and Social Enterprise Mentors to Design, Implement and Measure High Impact Innovation (Social Entrepreneurship) Programmes and Projects.

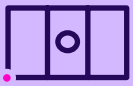
Technology Transfer Best Practice and Skills Development Training for Practitioners

Partner: BAJAINNOVA

2016-2017

The project will be carried out by Isis Enterprise, the consulting arm of Oxford University Innovation Ltd (OUI), which is the University of Oxford's technology transfer company. OUI manages nearly 2,500 patents and patent applications, closes an average of 100 business agreements a year, and has helped create more than 100 university companies since 2000. OUI is widely acknowledged as one of the leading OTTs worldwide, and it was recognised as the "Technology Transfer Unit of the Year" by the Global University Venturing in 2014.

Mexican Institution
Instituto de Ciencia y Tecnología de la Ciudad de México (ICYT)
Centro de Investigación y Desarrollo Tecnológico en Electroquímica (CIDETEQ)
Centro de Tecnología Avanzada (CIATEQ)
Centro de Ingeniería y Desarrollo Industrial (CIDESI)
Universidad Nacional Autónoma de México (UNAM)
Unidad de Vinculación de la Química (UVQ)
Universidad Autónoma de Sinaloa (UAS)
Universidad Autónoma del Estado de Morelos (UAEM)
Universidad Autónoma de Querétaro (UAQ)
Universidad de Guadalajara (UdG)
Tecnológico de Monterrey (ITESM)
Colegio de Estudios Científicos y Tecnológicos del Estado de Hidalgo (CECYTEH)



STEM Teaching Programme

PArtner: Academia Mexicana de Ciencias

2016- 2017

This project trained 68 AMC science teachers and tutors by UK STEM experts on the development and use of new pedagogies and higher level thinking skills including problem solving, critical thinking, collaboration, creativity, communication and inquiry.

Appendix 5

Researcher Connect

2017-2018

Partner: IMSS

Mexican Institution	Project Name
IMSS	Communication Skills Training Program for Researchers

Appendix 6

Newton Fund Impact Scheme

2020-2021

Partner: COPOCYT

Mexican Institution	UK Institution	Project Name
UNAM	University of Strathclyde	Technology Development Towards Sustainable Marine Current Energy Harvesting for Coastal Communities in Mexico
CINVESTAV Mérida	Swansea University	Textiles to Terawatts: Exploring the Global Opportunity for Screen Printed Photovoltaics
Instituto de Energías Renovables (IER-UNAM)	The University of Birmingham	Capabilities-Led Energy Poverty Alleviation via Innovative Community Solutions (CaPAS)
Universidad Tecnológica Metropolitana, Mérida, Yucatán	Coventry University	Reducing Social and Economic Inequalities through Creative Economy and Social Entrepreneurial Interventions in Southern Mexico
Instituto Tecnológico de Morelia	University of Manchester	Multi-Modality Instrumentation for Optimal Management of Irrigation Water Resources
Instituto Mexicano del Petróleo	Surrey University	A Decision Support Platform for Bioenergy Technology Deployment and Policy Making in Mexico
Universidad Autónoma de Baja California	University of the West of England	Reducing Organisational Vulnerability of Women: Applying Organisational Research in Mexican-US Borderlands

2020-2021

Partner: CONCYTEP

Mexican Institution	UK Institution	Project Name
IBERO Puebla	University of Edinburgh	Climate Change Policies for People: Implementing Co-Developed Water Governance and Security in the Upper Atoyac River Basin, Puebla

Appendix Peru

Appendix 1	Researcher Links Workshops

2018-2019

Partner: CONCYTEC

Peruvian Institution	UK Institution	Project Name
Instituto del Mar del Perú	Plymouth Marine Laboratory	International Training Workshop on Microplastic Debris
Instituto Geológico Minero y Metalúrgico (INGEMMET)	University of Bristol	Strengthening Capacity for Mitigation of Huayco (Flash Flood) Impacts in Peru
Universidad Nacional Agraria La Molina	Lancaster University	Water-Saving Agriculture to Mitigate Impacts of Climate Change
Universidad Nacional de Trujillo	University of East Anglia	First International Workshop on Paleoclimate, Water Use and Environmental Phenomena in Ancient Peru and their Contemporary Impacts
Universidad de Piura	University of Surrey	SUSPIRE - Sustainable Biomass Processing and Conversion

Peruvian Institution	UK Institution	Project Name
Pontificia Universidad Católica del Perú	University College London	Integrating Technologies to Improve Capability of Monitoring Marine Surfactants in Ocean, Rivers and Lakes Using Autonomous Vessels
Instituto Nacional de Salud	London School of Hygiene and Tropical Medicine	Pioneering 21st Century Control of Drug-Resistant TB - Harnessing the Power of Next Generation Sequencing for Real Time Molecular Epidemiology and Universal Rapid Resistance Testing
Universidad Nacional Agraria la Molina	University of Warwick	Towards the Production of Improved Seeds of Exportable Vegetables of Peru through Next-Generation DNA Sequencing
Instituto Geofísico del Perú	Birmingham City University	Building Resilience in Flood Disaster Management in Northern Peru
Facultad de Medicina Veterinaria, Universidad Nacional Mayor de San Marcos	School of Veterinary Medicine, University of Surrey	The Road Map to Echinococcosis control in Peru: Review and Synthesis of the Evidence

Appendix 2

Instituciones participantes en el programa de movilidad de investigadores - Researcher Links Travel Grants

2018-2019

Partner: CONCYTEC

Peruvian Institution	UK Institution	Project Name
Universidad Nacional de Tumbes	University of Salford	Use of Composites of Biochars and Advance Nanomaterials for the Abatement of Heavy Metals and Arsenic from Water Used in Rice Irrigation in Tumbes-Peru
Universidad Peruana Cayetano Heredia	University of the West of England, Bristol	Development of Innovative Green Infrastructure for Remediating and Recovering Contaminated Environments in Peru
CONOPA - Instituto de Investigación y Desarrollo de Camélidos Sudamericanos	Cardiff University	Genetic Characterisation and Sustainable Management of Peru's Wild Camelids
La Universidad Peruana de Ciencias Aplicadas (UPC)	Bournemouth University	Tourism's Role in Protecting and Restoring Natural Capital in Amazonian Peru
Pontificia Universidad Católica del Perú	University of Leeds	Viscous Cities: Landslides and Urbanization in Contemporary Andean Cultures

Peruvian Institution	UK Institution	Project Name
Centro de Investigaciones Tecnológicas, Biomédicas y Medioambientales (CITBM)	University of Surrey	Human-Wildlife Interaction and Health in Peru: Bat Bites and Disease Risk
Centro de Competencias del Agua	University of the West of England	Water Governance in Mountainous Regions: Drivers and Adaptive Responses to Global Change
Universidad Peruana Cayetano Heredia	Wellcome Trust Sanger Institute	Genomic Epidemiology of Antibiotic-Resistant Enterobacteria in Human, Animal and Environmental Reservoirs in Lima, Peru
Universidad Peruana Cayetano Heredia	University of Hull	Exploring Methods to Evaluate Oil Pollutant Exposure in Aquatic Biota in Rivers of the Peruvian Amazon Jungle
Universidad de Piura (UDEP)	University of Surrey	Enabling Technologies and Process Engineering for Biomass Utilization

Appendix 3	Institutional Links

2018-2019

Partner: CONCYTEC

Peruvian Institution	UK Institution	Project Name
Universidad Nacional de Ingeniería	Keele University	Towards Smart Phone-Assisted Sensors for Monitoring Soil Nutrients in Sustainable Farming
Universidad Peruana Cayetano Heredia	University College London	Multi-Morbidity and Infectious Diseases: Strengthening Links Between the UK and Peru
Universidad Peruana Cayetano Heredia	Cardiff University	Understanding and Modelling the Distribution of the Double Burden of Malnutrition in Peru
Universidad Peruana Cayetano Heredia	University of the West of England	Strengthening Local Capacities for the Sustainable Management of Andean Headwater Wetlands Facing Global Change
Universidad Nacional Mayor de San Marcos	Cardiff University	RADEC - Rapid Adaptation to Extreme Climates in Peruvian Sheep

Peruvian Institution	UK Institution	Project Name
Universidad Nacional Agraria La Molina	Lancaster University	Field-Based Phytohormone Phenotyping to Select Climate Resilient Cereal Varieties
Instituto Nacional de Salud	London School of Hygiene and Tropical Medicine	Genomic Epidemiology of Drug-Resistant Tuberculosis in Peru
Instituto de Investigación de la Amazonía Peruana	University of St Andrews	Protecting Biodiversity and Sustainable Livelihoods in the Wetlands of Peruvian Amazonia
Instituto de Investigación de la Amazonía Peruana	University of Leeds	Novel Approaches to Understand the State of Biodiversity and Support Livelihoods: the Distribution and Degradation Levels of Mauritia Flexuosa Stands in Amazonia
Universidad Nacional Agraria La Molina	University of St Andrews	Developing a Dynamic Co-Management By-catch Risk Assessment to Protect Biodiversity in an Artisanal Shrimp Trawl Fishery in Peru (DYNAMICOPERU)
Pontificia Universidad Católica del Perú	Staffordshire University	Development of an Ultrasound-Based Diagnostic Tool to Identify Diabetic Foot Ulceration Risk in Peruvian Population

Appendix 4	Professional Development & Engagement

Technical Assistance on Mission Oriented Research and Innovation

Partner: CONCYTEC

2020-2021

The methodology initially requested to kickstart this project was mission-oriented research and innovation. With this in mind, the first step was to train decision makers on how it works. Joining efforts with CONCYTEC, this project's objective was to work with the presidential cabinet, the Ministry of Foreign Affairs and Tourism, the Ministry of Economy and Finance, and the Ministry of Production to promote digital transformation in order to contribute to the rise of the Peruvian economy post Covid-19.

Peruvian Institution	**UK Institution**
CONCYTEC	University College of London
Congreso	UKRI
La oficina del gabinete presidencial	Nesta
Ministerio de Economía y Finanzas	Oxentia Ltd.
Ministerio de Producción	IIPP
Ministerio del Ambiente	
Ministerio de Educación	
Ministerio de Relaciones Exteriores	
Tumbes	
Piura	

Peruvian Institution	UK Institution
La Libertad	
San Martin	
Tacna	
Cajamarca	
Moquegua	
Cuzco	
Ayacucho	
FabLab	
CREEAS	
Asociación Pataz	

Technical Assistance on Botanic Garden

The technical assistance project was in charge of designing and developing, together with Peruvian stakeholders, the national botanical garden initiative for scientific research, biodiversity preservation, education, and for the enjoyment of nature in Peru. During the past 3 years, the project has been growing in hand with key stakeholders, such as the Ministry of Environment, CONCYTEC, and the Ministry of Culture, among others. This project is aligned with Peru's global commitments to the OECD and the Climate Change Agenda.

CONCYTEC	The Scottish Government (Environment & Forestry)
Ministerio del Ambiente	Botanic Gardens Conservation International (BCGI)
Ministerio de Cultura	University of St Andrews
Universidad Nacional Agraria La Molina	Royal Botanic Garden of Edinburgh
Instituto de Investigación de la Amazonía Peruana (IIAP)	Royal Botanic Gardens, Kew
SERFOR	South African National Biodiversity Institute
Asociación Pro Jardín Botánico de Lima	
Asociación Pro Naturaleza	
PROFONANPE	
Centro Internacional de la Papa (CIP) - CGIAR	
Centro Nacional de Salud Intercultural (CENSI)	
Instituto Nacional de Innovación Agraria (INIA)	
Museo de Historia Natural	
Servicio de Parques de Lima (SERPAR)	
Parque de Las Leyendas	
Ministerio de Comercio Exterior y de Turismo	
Comisión de Promoción del Perú para la Exportación y el Turismo	

Technical Assistance on Scientific Advisory Unit

The Newton-Paulet alliance prioritized research governance as its key area in the Peruvian PDE programme. The objective of the programme was to build and strengthen each country's capacities in order to create a more integrated and productive science, technology and innovation ecosystem.

The programme's vision sought to enable collaborative and inclusive research, as well as to help set the foundations for the translation of research to society through evidence for policy and to promote technology transfer by means of the private sector.

CONCYTEC	UK Parliamentary Office of Science and Technology (POST)
Congreso	University College of London

Appendix 5	Newton Fund Impact Scheme

2021-2022

Partner: CONCYTEC

Peruvian Institution	UK Institution	Project Name
Universidad Nacional Agraria La Molina	Lancaster University	Applying and Evaluating a New Quantitative Method to Select Climate-Resilient Cereal Varieties to Improve Farmer Livelihoods and Community Nutrition in Peru
Instituto Nacional de Salud	London School of Hygiene and Tropical Medicine	Translation through Demonstration: Moving TB Whole Genome Sequencing in Peru from Research into Policy and Practice

Appendix LATAM

Appendix 1	Researcher Links Workshops LATAM

Argentina

2017

Argentinian Institution	UK Institution	Project Name
CONICET	Royal Botanic Garden, Edinburg	Perspectives on Plant Dynamics and Climate Change in the Andes
NIBIOMA, Universidad Nacional del Comahue, CONICET	NERC Centre for Ecology and Hydrology	Safeguarding Pollination Services in a Changing World (SURPASS)
Universidad Nacional de Río Negro	University of Reading	Better Crop Pollination and Pest Regulation for the Ecological Intensification of Smallholder Farmers in Argentina

Brazil

2017

Brazilian Institution	UK Institution	Project Name
Instituto Nacional de Pesquisas Espaciais	University of St Andrews	Remote Sensing for Biodiversity and Ecosystem Services Inventory
Universidade Estadual de Campinas	University of Oxford	Tropical Transitions: The Role of Biodiversity in Resilience to Global Change of Tropical South American Ecosystems

Chile

2017

Chilean Institution	UK Institution	Project Name
Centro Regional de Investigación Horto-frutícola de Valparaíso	University of Reading	Biodiversity Conservation and Ecosystem Services Provision to Improve Economic, Environmental and Social Performance in Smallholder Farms

Colombia

2017

Colombian Institution	UK Institution	Project Name
Corporación Universitaria Minuto de Dios	Middlesex University	Social Innovation for Maintaining and Restoring Natural Capital in Latin America

Mexico

2017

Mexican Institution	UK Institution	Project Name
Centro del Cambio Global y la Sustentabilidad en el Sureste (CCGSS) y UNAM	University College London	Maintaining Biodiversity and Ecosystem Services for Sustainable Development Under a Changing Climate

Peru

2017

Peruvian Institution	UK Institution	Project Name
Universidad Nacional Agraria La Molina	University of Exeter	Valuing Biodiversity and Developing Ecosystem Service Delivery Models in Densely Inhabited Latin American Dry and Montane Forests
Universidad Peruana Cayetano Heredia	Manchester Metropolitan University	Identifying Priority Biodiversity Research and Capacity Building Needs to Inform Sustainable Management of South American Dry Forest Resources

Appendix 2	Researcher Links workshops LATAM

Argentina

2017

Argentinian Institution	UK Institution	Project Name
Universidad Nacional del Litoral	Cardiff University	Development of Strategies for the Analysis of Genomic and Transcriptomic Data of Reptile and Amphibian Species of Environmental, Commercial and Health Importance
	University of Reading	Better Crop Pollination and Pest Regulation for the Ecological intensification of Smallholder Farmers in Argentina

Brazil

2017

Brazilian Institution	UK Institution	Project Name
Universidade Federal de São Carlos	Durham University	The Ecological and Human Impacts of Invasive *Hedychium Coronarium*-Capybara Dynamics in Sao Paulo State, Brazil
Universidade de São Paulo	University College London	Wasp Farms as Natural Bio-Control for Sustainable Agriculture

Chile

2017

Chilean Institution	UK Institution	Project Name
Universidad de Concepción	University of Cambridge	Linking Biodiversity and Ecosystem Services in Changing Landscapes
Pontificia Universidad Católica de Chile	Aberystwyth University and Marine Biological Association	Knowledge and Gaps: Projecting the Impact of Kelp Fishery in Marine Communities of Central-Northern Chile
Universidad Austral de Chile	University of Stirling	An Interdisciplinary Approach to Encourage Coexistence Between Livestock Production and Biodiversity Conservation in Chile

Colombia

2017

Colombian Institution	UK Institution	Project Name
Instituto de Investigaciones Biológicas Alexander von Humboldt	The Natural History Museum	Identification of Risks and Opportunities for the Conservation of Butterflies in Post-Conflict Colombia
Pontificia Universidad Javeriana Cali	King's College London	Prioritizing Ecological Restoration in Degraded Watersheds

Mexico

2017

Mexican Institution	UK Institution	Project Name
El Colegio de la Frontera Sur (ECOSUR)	University of St Andrews	Managing Cattle Ranching and Biodiversity Conservation Conflicts in Latin America: Decision-Making Processes to Reconcile Paradoxical Local and Global Goals
Universidad Autónoma Metropolitana (UAM)	University of East Anglia	Conservation and Sustainable Management of Biodiversity and Ecosystem Services in Peri-Urban Areas of Mexico
Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV)	The Open University	Measuring Carbon Flows in Mangrove Ecosystems: Importance and Vulnerability

Peru

2017

Peruvian Institution	UK Institution	Project Name
Instituto de Investigaciones de la Amazonia Peruana	University of Leeds	Dissolved Organic Carbon (DOC) Fluxes and the Hydrological Budget In Peruvian Tropical Peatlands
Universidad Nacional Mayor de San Marcos	Cardiff University	Genetic Characterisation of the Demographic History and Conservation Status of Wild and Domestic South American Camelids

Appendix 3	Institutional Links LATAM

Argentina

2017

Argentinian Institution	UK Institution	Project Name
Museo Argentino de Ciencias Naturales (MACN), CONICET	Royal Botanic Gardens, Kew	Impact of Forest Degradation on Plant and Fungal Diversity and Distribution in Southern Patagonia: Increasing Awareness and Preserving Endemic Species

Brazil

2017

Brazil Institution	UK Institution	Project Name
Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP)	Royal Botanic Gardens, Kew	Baseline for the Sustainable Management of Karst

Mexico

2017

Mexican Institution	UK Institution	Project Name
Facultad de Estudios Superiores Iztacala, UNAM	Royal Botanic Gardens, Kew	Conserving Native Useful Trees of Mexico to Maintain its Natural Capital

Peru

2017

Peruvian Institution	UK Institution	Project Name
Universidad Nacional Mayor de San Marcos	Royal Botanic Garden Edinburgh	Increasing Knowledge of Dry and Montane Ecosystems Across Peru
Instituto Nacional de Salud, INS	Royal Botanic Gardens, Kew	Use of Seed-Banking to Enhance Conservation and Access to Medicinal Plants from Highlands of Moquegua, Peru

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References

Departamento Administrativo Nacional de Estadística de Colombia. 2020. “Panorama sociodemográfico de la juventud en Colombia”. https://www.dane.gov.co/files/investigaciones/genero/informes/informe-panorama-sociodemografico-juventud-en-colombia.pdf.

Department for Business Energy & Industrial Strategy. n/d. “The Newton Fund - Findings and Recommendations from Tetra Tech’s Final Evaluation Report”. https://www.newton-gcrf.org/wp-content/uploads/2022/07/Newton-Fund-Evaluation-Summary-July-22_v6.pdf.

Department for Business, Energy and Industrial Strategy (BEIS). 2020. *The Newton Fund Operational Framework*. https://www.newton-gcrf.org/wp-content/uploads/2020/10/Newton-Fund-Operational-Framework.pdf.

Embajada Británica Colombia, Newton-Caldas Fund. *Newton-Caldas Fund Report 2014-2020*. Colombia, 2022.

Instituto Humboldt. December 1 2022. “Lanzamiento. Catálogo de Plantas Útiles y Catálogo de Hongos”. Colombia. https://www.youtube.com/watch?v=vYknmvt6aGI.

Ministerio de Cultura de Colombia. “Lenguas Nativas y Criollas de Colombia”. n/d. Consulted January 20, 2023. http://mincultura.gov.co/areas/poblaciones/APP-de-lenguas-nativas/Paginas/default.aspx.

Sepúlveda Koptcke, Luciana, Gustavo Correa Matta, Clarice Melamed, and Denise Nacif Pimenta. 2020. “Portfólio de Resultados das Pesquisas sobre Zika”. https://portal.fiocruz.br/sites/portal.fiocruz.br/files/documentos_2/portfolio_zica_0609_web_1.pdf.

Veiga Mariana, Diego Arruda, Maíra Brito, and Thaissa Avena. 2020. “The Newton Fund in Brazil 2014-2020”.