RESEARCH FOR GLOBAL DEVELOPMENT
THROUGH GCRF AND NEWTON FUNDS
At the University of Leeds we’re committed to ensuring that our research addresses global challenges, and are very proud of our portfolio of research funded by the Global Challenges Research Fund (GCRF) and the Newton Fund.

Since 2014

We have received over £45 million to support projects funded by GCRF and Newton

We have received over 70 research awards

In over 30 countries

Breadth and depth

We have a broad portfolio of global research projects supported through these funding streams, ranging from relatively small projects that fund networking between researchers, support capacity building, or trial pilot studies, through to very large scale projects.

Three of the largest GCRF projects we lead are:

- **GCRF-African Swift** (Science for Weather Information and Forecasting Techniques), which is mitigating the risks and impacts of extreme weather events through training, communications and the wider application of weather forecasting.
- **GCRF-AFRICAP** (Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy), which is bridging the gap between localised agriculture, policy advocacy and regional and national food policies for improved food and nutritional security.
- **Changing the Story**, which is working with young people in Colombia, Cambodia, South Africa, Rwanda and Kosovo, to develop leadership skills to tackle today’s major challenges.

Our most significant Newton Fund success is **Development of Radio Astronomy in Africa (DARA)**. This is an education and international development programme empowering Africans to exploit the global investment in Square Kilometre Array (SKA) Radio telescopes, and the data that it captures, for new academic programmes, economic development and small business creation. SKA radio is an international effort to build the world’s largest radio telescope to explore the universe. Political scientists have joined this project to assess the benefits and trade-offs of such initiatives, and the project now has a footprint in Central America and in South East Asia.

Systems-based and interdisciplinary approach

Our broad disciplinary strengths, coupled with a focus on interdisciplinarity, has meant that we excel in taking a “systems-based” approach to tackling global challenges.

Ever since the GCRF was announced in 2015, Leeds has been firmly focussed on mobilising and supporting its researchers to respond to the challenges posed, by supporting challenge-led working within the University and by strengthening our global partnerships.

We have built on existing links to institutions in developing countries to enhance our strategic relationships, and we have developed a range of new collaborations.

In **GCRF-AFRICAP**, Professor Tim Benton is leading a team of UK researchers from Leeds (environmental social scientists, climate modellers, experts in climate adaptation, rural livelihoods and conservation agriculture, plant scientists, food processing experts and ruminant nutritionists), Aberdeen (nutrition, and plant and soil science) and the Met Office. This team is working with local universities, organisations and governments in Malawi, South Africa, Tanzania and Zambia, to create a network of Special Agricultural Zones which will provide an evidence base to underpin country-specific policies in agriculture and food production.

In **African Swift**, a team of 25 UK and 45 African atmospheric scientists, social scientists and operational forecasters, led in Leeds by Professor Alan Blyth, is working to develop skills to provide benefits for policy-makers in, for example, agricultural planning and disaster preparedness and benefits to commercial activity such as power generation, transportation, and fisheries.

Building relations

In this booklet we have highlighted six of our case studies that represent our wide portfolio of GCRF activities. You can see how Leeds academics are working with researchers, governments and NGOs in West Africa, Nepal, Vietnam, Southern Africa and Kenya. These are just a representative sample of our engagement across sub-Saharan Africa and South Asia.

Other Leeds researchers are working with teams across Central and South America. The ‘Sumak Kawsay and the Sustainable Development Agenda’ network, for example, works with indigenous groups in Colombia and Brazil to explore local understandings of environment, peaceful communal living and the reduction of inequalities, both economic and social.
Equal partnerships

At the same time, we are acutely conscious of the risk that collaborations between the Global North and Global South can all too easily appear to be lopsided. We ensure that our projects embed co-design and co-creation, and they strive for shared and mutually beneficial outcomes.

Just one example of this, featured in this booklet, is A Sustainable Approach to Research, involving Dr Anne Tallontire from Leeds and students and academics from Kenyatta University who are making progress towards the development of a green economy. In this project, the Leeds team is working with their Kenyan research partners to co-develop and co-design research that embeds the principles of environmental sustainability across the University and beyond.

Ongoing challenges

Over recent decades, humankind has made huge strides in tackling big societal issues, even if this is not always readily apparent.

Since the early 1990s, more than 1 billion people have emerged from extreme poverty, far fewer people across the world die from preventable diseases, and child mortality has decreased rapidly.

But huge challenges remain: the urgent need to improve the lives of the very poorest people; the potentially catastrophic impact of climate change on those who lack the resources to adapt; how to feed a growing global population while reducing the impact of food production on the environment; migration and forced displacement; low-carbon energy and sustainable economic growth, and many others besides.

The University is determined to play its part in addressing these continuing challenges. I hope this booklet demonstrates our commitment to this agenda, and to the principles of equal partnership and interdisciplinarity that will underpin our collective progress.

Professor Lisa Roberts
Deputy Vice-Chancellor: Research and Innovation
Making household surveys work for the world’s poorest

Dr Helen Elsey

How do governments in poorer countries make decisions about where to allocate services and resources? Household surveys are usually the only data available to inform this process, but all too often, the results they yield do not represent the needs of families and individuals living in poor urban neighbourhoods and informal settlements.

The question of how to organise and carry out surveys so that they provide useful information about these communities and health inequities – and in a format that can be easily used – is being tackled in a research programme led by the Leeds Institute of Health Sciences.

The project is both international and interdisciplinary in its scope to develop survey methods and build the capacity of government officials to make use of the data to enable long-lasting impact that can be tracked over time.

As well as modernising existing survey methods so they are appropriate for use in ever-growing urban areas in low income countries and are representative of poor urban populations, a key aim of the project is to find out if a newly-designed approach could help shed light on two previously over-looked health issues: injury and mental health.

Falling through the cracks

The research is funded by the Global Challenges Research Fund (GCRF), a £1.5billion government programme to support research that addresses critical problems in low and middle-income countries across the world.

The project is both international and interdisciplinary in its scope, drawing together researchers in Leeds and Southampton, with NGOs and governments in three target countries to develop survey methods and build the capacity of government officials to make use of the data to enable long-lasting impact that can be tracked over time.

Focusing on population samples taken in Bangladesh, Nepal and Vietnam, a team of researchers from the Institute set out firstly to investigate why certain groups of people were falling through the cracks.

“When we looked at some of the samples taken in these surveys, and put them into categories that show their income and wealth, it became very obvious that the majority of people selected had come from the highest income bracket,” explains Helen Elsey, Associate Professor in Public Health at the Leeds Institute of Health Sciences.

“This is mainly because the maps used to select sampling areas are drawn around administrative boundaries, and don’t show the slum areas and informal settlements that spring up during rapid urbanisation. These areas are not recognised by governments and the people living there are often not part of any census.”

New sampling technique

In partnership with the University of Southampton, the researchers are using a system called WorldPop, developed at Southampton, that uses satellite imagery combined with mobile phone and census data to reveal areas of dense population. The aim is to use this data to inform sampling decisions before surveys are carried out, to ensure samples are representative of the population as a whole.

Informal settlements are not recognised by governments and the people living there are often not part of any census.

Working with research NGOs in each of the three pilot countries, the researchers are now planning to trial this system ‘on the ground’, carrying out surveys in Kathmandu in Nepal and, from the beginning of 2018, in Dhaka in Bangladesh, and Hanoi in Vietnam.

By analysing these results, the research team will be able to check how successful they have been in increasing the proportion of the poorest in the urban samples.

As well as testing the new geographical sampling methods, the researchers will also assess how the terminology used in the surveys is applied to people living in the poorest areas of the city.

“A definition of a household is, traditionally, anybody who shares a cooking pot,” says Dr Elsey. “But if, for example, you have a group of single migrant men all living together, who don’t cook at all, but live off street food – they might well get excluded simply because they don’t fit the definition.”

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Engaging with data

In a further research strand, the team is working with local governments in each of the three cities to try to better understand how existing data from household surveys is used, and explore how their new approach could help identify particular groups of people who might benefit from additional support. Working with the Health Informatics Group at the University of Leeds, the team are exploring options for a dashboard that will enable governments to engage with the data, assess how well they are doing on different issues, and track the impact of interventions over time.

"Identifying specific geographical areas with particular health problems can be politically sensitive, but clearly presented data in a user-friendly dashboard can help identify particular groups of people, such as migrant labourers, where certain health interventions could make a big difference," says Dr Elsey.

This explorative work is expected to be completed in each of the three cities by March 2019. After that point, the researchers hope to be able to work with some of the large companies commissioned to carry out the surveys.

“If we can prove the benefits of our new approaches, then the next step would be to encourage these organisations to adopt them, and also to include particular questions on injury and mental health,” says Dr Elsey. “We know, from the limited evidence, that injury rates are really high among people living in poor urban neighbourhoods, and that mental health is badly affected by the stresses of living in slum areas, yet there’s no large-scale population data, which makes it difficult to advocate for services.”

“Surveys are usually carried out every four years, so if these questions are included on a regular basis, you can start to see the impact of interventions and identify areas where there is still need.”

Dr Helen Elsey is a Lecturer in Public Health at the Leeds Institute for Health Sciences and works at the Nuffield Centre for International Health and Development. She sits on the International Committee of the Faculty of Public Health and is co-chair of the special interest group on ‘Healthy Places’.

“Informal settlements are not recognised by governments and the people living there are often not part of any census.”
Mangrove forests cover thousands of hectares of coastline in many of the world’s tropical and sub-tropical countries. As well as supporting the livelihoods of people who live and work near the forests, the trees play a significant environmental role, protecting the coastline from storm surges during extreme weather. Mangroves are also important for carbon storage, helping to regulate climate change.

But the forests are under increasing threat from economic growth. In Brazil, for example, a large harbour development proposed in the Amazon Delta will require significant areas to be cleared, while in Tanzania, tourism is responsible for mangrove trees being cut down to make way for sea view hotels.

Understanding how mangroves support local economies, but also how these forests have changed over time in both the density and quality of the vegetation could provide valuable information to help manage these important resources.

Teaming up with Vietnamese partners

At the University of Leeds, researchers in the School of Earth and Environment have teamed up with experts from the Vietnam National University (VNU), the Hanoi National University of Education (HNUE), and the Vietnam National Space Centre (VNSC) to investigate mangroves in Vietnam’s Red River Delta, where many sites are being cleared to make way for large scale aquaculture.

“In the Red River Delta, a key challenge is in the management of these forests,” explains Dr Claire Quinn, who is leading the project. “The land is cleared to make way for aquaculture, such as clam and shrimp farming. These activities usually aren’t done by local people – instead, investors export most of the seafood overseas and as soon as there’s problem, a disease infestation, for instance, they abandon the land and move on. But because they still own the land rights, there’s no opportunity for the locals to access the land and start restoring the mangroves.”

In a three-year project funded by the Newton Fund and the Economic and Social Research Council, the team will use remote sensing data supplied by the VNSC to map changes in vegetation density over the past 25 years. Researchers in Leeds will also review published data on mangrove forests and compile a set of indicators to assess the varying quality of the vegetation over time.

Alongside this, researchers from HNUE will be working ‘on the ground’ to validate the remote sensing data through ecological analysis. The teams will also work with local communities to look at the relationships between mangroves and livelihoods and try to better understand how both forests and people contribute to a socioecological system in which each is supported by the other.

The project is underpinned by earlier work done at the University of Leeds led by Professor Lindsay Stringer, alongside colleagues in Vietnam, Brazil and Tanzania. This enabled the fundamental research questions to be outlined and also established the partnerships with Vietnamese research institutions that set the stage for the work to go ahead.

Gathering evidence to influence policy

The evidence gathered through the project will provide a picture of how the mangroves deliver essential services to communities, how the forests have changed in the past and are likely to change in the future and what impacts these changes might have on local communities and ecological systems. It will help regional governments understand, for example, where there might be critical areas for storm protection that should be considered when planning development in mangrove areas, or if mangroves are cleared, how that might affect the economy at a local level.

“As well as mapping how they have changed over time, we want to build a picture of what sort of mangrove areas local people would like to see in the future,” says Dr Quinn. “And then we need to figure out what we need to do to get to that point – do we need to change protected area boundaries, do we need changes to land rights, or large-scale reforestation programmes to make the mangroves more sustainable?”

“Investors export most of the seafood overseas and as soon as there’s problem, a disease infestation, for instance, they abandon the land and move on. But because they still own the land rights, there’s no opportunity for the locals to access the land and start restoring the mangroves.”
“We hope that the evidence we gather will be robust enough to inform policy in the area and help NGOs and other groups to better understand where to focus their resources,” says Professor Stringer.

“Our ultimate aim is to develop a Geographic Information System-based tool that will enable policy makers to try out different scenarios for development and conservation in the area that will help them to understand the effects of different approaches to managing the mangroves. This will lead to a more balanced consideration of how human decisions about the mangroves affect the ecosystem services – the carbon storage and environmental protection – and also could guide more sustainable livelihoods for the communities that rely on the forests.”

She added: “Mangroves are important to more than 120 countries around the world and so the approaches that we’re developing in Vietnam could also have a much wider significance than solely in the Red River Delta.”

The team also has plans to link their project to work being carried out by research groups from other institutions which looks at the effects of hydrology, sedimentation, and other environmental influences on mangrove forests.

Mangroves are important to more than 120 countries around the world. Understanding how they support local economies could provide valuable information to help manage these important resources.

“There are other factors, like damming upriver, or changes in the amounts of sediment in the rivers that might also pose future risks to the mangroves,” says Dr Quinn. “Being able to model these factors and show how they might affect both pristine and more degraded areas of mangrove could be critical in planning how to manage the forests effectively.”

Lindsay Stringer is Professor in Environment and Development in the School of Earth and Environment. Her research is interdisciplinary and uses theories and methods from both the natural and social sciences. She has an international consultancy reputation, undertaking commissioned work on several occasions for the United Nations, as well as for the UK Government’s Department for International Development and various other agencies and organisations.

Dr Claire Quinn is Associate Professor in Natural Resources Management in the School of Earth and Environment. She is a fellow of the Higher Education Academy and a Deputy Director for Research in the School. Her approach is interdisciplinary drawing on theories and methods from both the natural and social sciences.

“Mangroves are important to more than 120 countries around the world. Understanding how they support local economies could provide valuable information to help manage these important resources.”
Many of the United Nation's Sustainable Development Goals (SDGs) focus on basic needs, such as health, energy, environment, water and sanitation – these seem to be the domain of science, engineering and medicine. But to make real progress, we need the expertise of arts and humanities researchers too, says Stuart Taberner, Dean of Interdisciplinary Research at the University of Leeds.

Science is not the (full) answer

Look down the list of SDGs, he says, and you'll see many others that focus on wider issues, such as peace, justice, equality, human rights and partnership working. For these, science alone can't be the answer, or even the starting point. In fact, he argues, science can't provide a complete solution to any of the SDGs, which is why arts and humanities is essential in all areas of development.

“Arts and humanities research is about people and places - and so is development,” he explains. “For example, how people respond to an opportunity to take a vaccine, how widespread take up is and therefore how effective it can be, is very much dependent on people and place, and that's where the arts and humanities, working closely with the social sciences, are vitally important.”

Professor Taberner cites the Ebola outbreak in West Africa, which began in 2014, as an example. Huge medical resources were mobilised to try and contain the epidemic and yet transmission rates remained high. What ultimately made the difference was an understanding of how West African burial practices were impacting on efforts to contain the disease – and these kinds of subjects, essentially culture and social practices, fall squarely within arts, humanities and the social sciences.

“Historical research can feed into and influence modern day debates in developing countries,” says Professor Taberner. “Our work with the Foundation is helping it to be more of a campaigning organisation on human rights rather than simply a museum. We are now working with them on rolling out their programmes across sub-Saharan Africa, working with young people in a variety of countries to confront different histories of genocide and abuses of human rights. The aim is to promote greater resilience in post-conflict societies, and to develop young people’s leadership skills so that they can not only confront difficult pasts but also make a difference in the present, in relation to pressing challenges such as climate change, rapid urbanisation, and growing inequality. In this way, our research and work with our partners is feeding in across the SDGs.”
The work of Professor Taberner’s colleague, Professor Paul Cooke, provides a further example of research where arts and humanities research is making a difference – although the institutions he’s helping to build are at a very grassroots level. Professor Cooke has been working across a number of countries helping disadvantaged groups to make their voices heard through films about the issues they face. In South Africa, this involved working with a charity and local arts organisation to enable township children affected by HIV/AIDS to make films on issues such as bullying, drug and alcohol abuse and xenophobia. Again, empowering young people makes it possible for them to impact on issues right across the Sustainable Development Goals. More recently, Professor Cooke’s Changing the Story project has been working across five post-conflict countries – South Africa, Colombia, Kosovo, Cambodia and Rwanda – to use arts and humanities methodologies and practices to develop young people’s confidence and skills in addressing difficult pasts as well as a range of related issues including gender-based violence, environmental degradation, and religious and political extremism.

“Arts and humanities scholars are now beginning to realise for themselves just how vital their research is for development,” Professor Taberner says. “The acceptance from other disciplines is there. Now the onus is on the arts and humanities to take up the challenge, and to make even more of a difference to development and the SDGs.”

Stuart Taberner is Professor of Contemporary German Literature, Culture and Society in the School of Languages, Cultures and Societies, Faculty of Arts, Humanities and Cultures. He is also Dean for Interdisciplinary Research at the University of Leeds.

“Science can’t provide a complete solution to any of the SDGs, which is why arts and humanities is essential in all areas of development.”
Sustainability is the ability to maintain an activity without harm to, or depletion of, environmental, social or economic resources – and it’s something the University of Leeds takes seriously.

Leeds has one of the largest academic groups of sustainability experts in the world and an impressive suite of postgraduate and undergraduate sustainability degrees cutting across several disciplines. But it goes much further than that – sustainability is a thread that runs through all of the University’s activities, integrating research, training, teaching, work experience, external partnerships and the administration and management of the campus.

This holistic approach is what attracted Dr Dorcas Otieno from Kenyatta University to invite Leeds – and specifically Dr Anne Tallontire, from the Sustainability Research Institute – to be the UK partner in her UNESCO Chair programme, looking at higher education development for a green economy and sustainability (HEDGES).

The connection was made thanks to a Leeds graduate, who had been taught by Dr Tallontire as part of her MSc in Sustainability and Business, and so had seen first-hand how Leeds gives students practical experience of putting sustainability principles into practice.

The HEDGES programme has four main aims: establish an interdisciplinary sustainability research institute; ‘green the campus’ by bringing sustainability principles into Kenyatta University’s governance and management; develop the student curriculum, staff training and vocational courses to promote skills development for a green economy; and develop partnerships that can promote the sustainability agenda and a green economy more widely.

“Employers in Kenya make very similar complaints to employers in the UK – that universities aren’t preparing graduates for the world of work, in terms of key skills such as problem solving, project management, leadership and team working,” says Dr Tallontire.

“Many graduates are missing out on vocational skills that could really improve their employability. One of the aims of the HEDGES project that we’ll be working on is to develop these skills for Kenyatta students in the context of the green economy, with a particular focus on agriculture and renewable energy.”

When bringing different parties together that work in similar fields, I’ve always found we will have more in common in terms of skills and knowledge than divides us. So ultimately, it’s an approach that brings maximum benefit to everyone.

Working in partnership

It won’t be a one-way transfer of knowledge, but rather an equal partnership that Dr Tallontire hopes will bear fruit in many ways for both parties. Dr Otieno’s expertise is in education for sustainable development (ESD) and she has been involved in both international and national initiatives in Kenya to develop and promote ESD policies and the work of the Kenya Green Universities Network.

A number of joint workshops are already planned, to enable Leeds researchers to showcase how Leeds uses the University campus as a ‘living lab’ where students and academics carry out sustainability-related projects, such as biodiversity audits or community engagement.

Kenyatta and Leeds academics will also work together to audit the Kenyatta curriculum and look at ways that sustainability skills development can be incorporated, both into sustainability-related degrees and wider provision. At Leeds, for example, any undergraduate can broaden their knowledge by taking a ‘discovery module’ outside their core degree subject and many of these include sustainability knowledge and skills.

There are also plans to bring together early career researchers from both institutions, to develop collaborative research project proposals for submission to Kenyan funding bodies or relevant UK grant bodies, such as the Newton Fund.
Ensuring impact through co-production

As well as creating partnerships like this between universities to develop research ideas, Dr Tallontire believes passionately in co-production of research with stakeholders beyond academia, as the best way to ensure research has impact.

Co-production is the guiding principle of all of her research, most recently a pump-priming project looking at resilience for smallholders in agricultural supply chains. This will involve working with farmers’ organisations in East and West Africa to develop a research proposal ready to submit to funders.

Dr Tallontire explains: “In the traditional approach to research with a partner, the research agenda and the funding bid might be done jointly, but then the academics would define the project, collect and analyse the data, then pass the findings on to the partner and leave them to use the findings if they could.

In co-produced research, the academics will still collect the data, but every other stage is carried out together, ensuring research is designed to be of most benefit to users and the outcomes can be more easily put into practice. When bringing different parties together that work in similar fields, I’ve always found we will have more in common in terms of skills and knowledge than divides us. So ultimately, it’s an approach that brings maximum benefit to everyone.”

Dr Anne Tallontire is a Senior Lecturer in Business, Environment & Corporate Responsibility and Pro-Dean for Student Education in the Faculty of Environment. She is an interdisciplinary social scientist with background in economics, politics and development studies focusing on the way in which the private sector, including through corporate social responsibility, affects development.
When you think of big science projects – and in particular, space science – Africa is not the continent that springs to mind. But eight countries across Sub-Saharan Africa are set to take part in the world's largest ever radio astronomy initiative – and the University of Leeds is spearheading a project aimed at ensuring they can make the most of this opportunity.

Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia and Zambia are due to host radio telescopes in the second phase of the Square Kilometre Array (SKA) – a major international effort, which will see thousands of dishes installed across Africa. The aim is to provide something approaching a square kilometre (one million square metres) of collecting area, to enable astronomers to study the sky in unprecedented detail and survey the sky much deeper than ever before. South Africa’s Karoo desert will host the couple of hundred dishes that form the first phase, with construction due to start in 2018. But to gain the resolution required, a second phase is also needed, extending the telescopes across sub-Saharan Africa.

Radio astronomy studies objects in space based on the radio signals they emit, tackling questions such as how stars and galaxies are formed and how they evolve over time. However, with the exception of Mauritius, radio astronomy as a discipline is mostly non-existent in the eight countries taking part in Phase Two of the SKA: it is not taught at universities and there is no research undertaken in the discipline. So a ‘precursor’ project is underway, converting large but defunct satellite communications dishes into radio telescopes, to get things moving before the more sophisticated antenna of the SKA arrive.

But the problem remained that trained radio astronomers would be needed to operate the telescopes in those countries – and this was where Melvin Hoare, Professor of Astrophysics at the University of Leeds, saw he could help.

"Ghana was chosen to be the first country to have a telescope converted just as the Royal Society were offering grants for scientific collaboration between the UK and Ghana," he recalls. "We won funding to run a basic radio astronomy training course for Ghanaian physics graduates – and it’s grown from there.”

Thanks to a Newton Fund grant in 2015, this initial work with Ghana led to the Development in Africa with Radio Astronomy (DARA) project, expanding to include Kenya, Zambia, Namibia and Botswana. Matched resources were put in by South Africa to deliver this joint project. A further £2.7 million from the Newton Fund, awarded in 2017, means the DARA project can now continue until 2021, with all eight countries in the SKA taking part.

Big science can inspire future generations to study science. It’s a simple equation: more scientists are good for an economy.

The concept is simple: each year, in each country, up to ten graduates in physics or another relevant discipline undergo basic training in radio astronomy, delivered in four intensive, two – week units. These cover: astrophysics; technical training in using a radio telescope; radio astronomy observation; and data reduction and analysis. Trainees can then apply to study for a Masters degree or in some cases, a PhD, in South Africa, the UK or Mauritius.

Trainees are also given additional training in high-level computing, commercial awareness and science outreach – all part of the project’s aspirations to do far more than simply create a new generation of radio astronomers, ambitious as that goal is in itself.

Professor Hoare explains: "We’ve been awarded the funding to support development in these countries and we firmly believe that a big science project like the SKA can do this – its founder talked of ‘raising the eyes’ of the African continent.

"Big science – and the home-grown scientists that do it – can inspire future generations to study science. It’s a simple equation: more scientists are good for an economy. Of course, not all those we train will become radio astronomy researchers. But the technical knowledge and additional skills they gain will open many other avenues, all of which can benefit them as individuals and the country as a whole.”

The concept is simple: each year, in each country, up to ten graduates in physics or another relevant discipline undergo basic training in radio astronomy, delivered in four intensive, two – week units.

To date, 70 trainees have undertaken the basic programme, with four now studying for a Masters and a further three studying for a PhD in the UK funded by the DARA programme. A similar number are undergoing advanced training in South Africa and their home countries as part of the project. Others have used the training to help win their own places on Masters and PhD programmes.

"Big science can inspire future generations to study science. It’s a simple equation: more scientists are good for an economy.”
Alongside the University of Leeds in providing the training are the Universities of Manchester, Oxford and Hertfordshire, with Bristol and Central Lancashire joining soon. These institutions are already working together on another project—to convert a satellite communications dish in Cornwall and connect it with the UK’s e-MERLIN network of radio dishes centred at Jodrell Bank. The company that runs the site in Cornwall, Goonhilly Earth Station Ltd, is part of DARA, providing the trainees with ideas about commercial applications for the skills they are gaining. And partners in South Africa providing training sites and study opportunities include the Hartebeesthoek Radio Astronomy Observatory, SKA-South Africa, five universities and the South African National Space Agency.

Professor Hoare is the first to admit that DARA is not a conventional use of overseas development assistance money. “The Newton Fund is about driving development through scientific collaboration, but most projects tend to focus on traditional areas of health, sanitation, agriculture, primary education,” he said. “Radio astronomy is a bit of an outlier. But we have very clear outcomes that we want to achieve, which is why this project has caught people’s imagination. By creating sustainable radio astronomy groups that can operate and exploit the telescopes in each country, we can help Africa make a real success of the SKA. That will be inspirational and transformational for each country’s aspiring young scientists and the continent as a whole.”

Melvin Hoare is Professor of Astrophysics and a member of the Astrophysics Research Group at Leeds. He is also a member of the International Square Kilometre Array Science Working Group, Principal Investigator of the e-Merlin Legacy Programme on Feedback in Massive Star Formation, Principal Investigator of the VLA Large Programme CORNISH Survey, and Co-leader of the Red MSX Source Survey.

“The concept is simple: each year, in each country, up to ten graduates in physics or another relevant discipline undergo basic training in radio astronomy, delivered in four intensive, two-week units.”
Weather forecasting in West Africa

Professor Doug Parker

Forecasting weather in the tropical climate of West Africa has long been a problem for the region’s meteorologists. Aged infrastructure, outdated forecasting methods and the sheer intensity of the region’s weather extremes make prediction difficult. As part of the Met Office Academic Partnership, scientists from the University of Leeds have devised the first bespoke training resource for current and future generations of meteorologists in West Africa.

“In Africa, there is a short pathway between weather and people’s everyday experience,” claims Professor Doug Parker, Professor of Meteorology in the Institute for Climate and Atmospheric Science (ICAS) at the University of Leeds.

“The weather can have a dramatic and immediate effect on how people work and live, particularly in places like West Africa where the weather can be so changeable and extreme. The livelihoods of many people are directly affected by weather patterns such as rainfall, drought, winds and extremes of temperature, on a day to day basis.”

Meteorologists use a variety of techniques to help them build up a picture of the flow and development of weather patterns. It’s something the Met Office has been doing since 1854, and in the UK we now have arguably the best weather forecasting and climate prediction system in the world. “In the Northern hemisphere we have great forecasts, but in West Africa they don’t currently enjoy the same benefits,” Professor Parker adds. “Without these forecasts, it can be difficult for anyone, from families to farmers, to plan an hour ahead, let alone a day or a season.”

Developed with partners across the UK and Europe, Professor Parker and colleagues have published Meteorology of Tropical West Africa: The Forecasters’ Handbook – the first comprehensive guide for weather forecasters in the region, and the first of its kind for any part of the world. Balancing theory and practice, the book is full of tools and techniques for amateur and professional meteorologists to improve their forecasts – and hopefully the lives of those who make West Africa their home.

The guide is informed by years of practical experience and partnership working between the University of Leeds and the Met Office, tackling some of the leading global challenges in weather forecasting and climate prediction.

African solution

“Across West Africa, there are 15 countries, each approaching weather prediction in different ways,” says Professor Parker. Each country has its own forecasting priorities, with resources and equipment of varying levels of sophistication, and many channels of communication. The challenge for Professor Parker and colleagues wasn’t simply to introduce a European model to the system, but to develop West African methods that would work in the region’s conditions and environment.

“We worked closely with local agencies to develop the resource. Across the region there are some highly trained experts, a long track record of local knowledge and some excellent equipment. Our role wasn’t to dictate how they should approach the task of forecasting in West Africa, but to develop solutions together,” he adds.

Professor Parker describes the relationship between partners in the project not as a transfer of knowledge, but as a ‘knowledge exchange’ – where both sides were keen to learn and develop from the interaction. The initiative has stimulated new research in the UK and Africa, which aims to improve innovation in forecasting for the years and decades to come.

Strong partnership

The project is just one of those that have been conducted as part of the long-standing partnership between the University of Leeds and the world-leading Met Office. The University has worked closely with the Met Office since the 1980s, using its growing expertise in meteorological science to improve our collective understanding of weather and climate.

In 2010, the University became one of four Met Office Academic Partners, along with the Universities of Exeter, Oxford and Reading, all of which play a key role in supporting the Met Office’s ambition to ensure the UK remains a world leader in the field of climate and weather prediction.

The strategic partnership is structured around four key research themes. As well as the focus on climate and its impacts, researchers are also focusing on atmospheric observations and processes, atmospheric composition and the Social Science implications of weather and climate.
Weather forecasting in West Africa

Practical experience

Professor Parker specialises in the study of the physics and fluid dynamics of the atmosphere, with a focus on storms, cyclones and monsoons in Africa and India. The Met Office Academic Partnership provides a clear practical focus for the work that Professor Parker and his colleagues are doing. “It allows us to develop and focus our research, which we can use to support better forecasts,” he says.

The relationship also allows innovative new models and approaches developed by the team to be put into practice as quickly as possible.

“The atmospheric chemistry and particulate models that we have developed at the University of Leeds are now part of the Met Office models,” Professor Parker says.

The partnership also involves Met Office staff spending time with Professor Parker and colleagues at the University of Leeds, taking part in collaborative projects that cover the whole range of the partnership.

The University also supports students to achieve formal qualifications, with 22 joint PhD students currently working with a range of supervisors at Leeds, collaborating with the Met Office on research problems in the physics, mathematics, chemistry and social sciences of the Earth’s climate system.

The benefits are reciprocal, with both partners profiting substantially from the relationship, exchanging views, opinions and insight. It creates an environment that encourages research innovation, and the practical application of scientific knowledge.

“In the UK we have the best weather forecasting and climate prediction system in the world.” Professor Parker says. “Working together with the Met Office, the University of Leeds is playing a key role in keeping it that way.”

Doug Parker is Professor of Meteorology, in the Institute for Climate and Atmospheric Science (ICAS) at the School of Earth and Environment and at the Met Office. Since 2010 he has been responsible for the coordination of the University’s formal partnership with the Met Office.
Challenge-led, solutions focused research

- We are 10th in the UK for research power (REF, 2014).
- We have over 164 GCRF and Newton-funded projects in over 30 countries to make progress across all 17 UN Sustainable Development Goals.
- Leeds is in the top 10 of UK universities for research council funding for total value of grants (Times Higher Education (THE) analysis 2018).
- The University of Leeds is the third largest university in the Russell Group and has more than 38,000 students from 170 countries, and 8,000 staff.
- The University has created over 100 spin-out companies.
- We have over 400 patents in our portfolio.
- Six of our companies are AIM listed.

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