POSITIVE FUTURES
PEOPLE, NATURE, PLANET

Seven Years of the Sussex Sustainability Research Programme

UNIVERSITY OF SUSSEX | institute of development studies

Acknowledgements
We acknowledge the contributions of many colleagues who have worked in the SSRP secretariat since 2017: Caroline Grundy, Fiona Hurd, Amy Sweet, Louis Pilard, Carlos Miret, Juliet Richardson, Katie Hiscock, Romi Faulderova, Edwin Gilson and Gofaone Koorapetse.

We also acknowledge the core team of Sussex researchers that submitted the original proposal to the University for funding SSRP: Fiona Marshall, Jørn Scharlemann, John Thompson, Stuart Harrop, John Thompson and Martin Todd.

Their invaluable support fostered a collaborative research culture well suited to an interdisciplinary centre of research excellence.

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Editorial support
The SSRP programme secretariat team and the Digital and Creative Media Team, Communications, Engagement and Advancement.

Design
Chimney Design

Photography
All images have been sourced from the University's photography archive, provided by the University photographer Stuart Robinson, or supplied by University partners, staff and alumni or their representatives.

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◀ A cloud forest in Intag, Ecuador. Image credit: Mika Peck

PREFACE

The Sussex Sustainability Research Programme (SSRP) was set up to foster interdisciplinary research on environmental sustainability and human equity that would have a positive impact, making a real difference to the lives of people globally and contributing to a sustainable future for our planet.

Our new University strategy, *Sussex 2035: Creating Progressive Futures: flourishing, sustainability*, and progress for the whole world, will build on the ground-breaking research carried out under the auspices of SSRP, through the strategic themes of environmental sustainability and human flourishing.

I am delighted here to share some recent highlights of SSRP's impressive body of work, which has had a wide range of important impacts on people, nature, and planet. SSRP's research was organised around six themes: Ecosystems, Rights and Justice, Planetary Health, South Coast Sustainability, Sustainable Climate and Food Systems, and Sustainability Frontiers. This report reflects each of these themes, including many case studies highlighting the difference made by the research.

I would like to express my heartfelt thanks to all the sustainability researchers at Sussex, to our global research partners, to the policy makers, and all the other stakeholders who have contributed to SSRP's research over the past year, and indeed throughout the life of the Programme.

We now look forward to building on this work, and to weaving new connections from those established by SSRP, as we collaborate, through our research and teaching, to create environmentally sustainable futures in which people around the world are able flourish.

Professor Sasha Roseneil
Vice-Chancellor and President

◀ A waterfall in Intag, Ecuador
Image Credit: Mika Peck

DIRECTOR'S INTRODUCTION

'Sustainability' has emerged as a critically needed bridge between the goals for development and goals for the environment. The development community realised they could not help advance the wellbeing of people if the natural environment, locally and globally, was in decline. At the same time, those aiming to protect the planet from pollution, climate change, and biodiversity loss recognised that this was not going to happen unless they put the welfare of people at the centre of their efforts. Hence a blending of development and environmental aims gave birth to sustainability.

Professor Joseph Alcamo
Director, Sussex Sustainability Research Programme

But it took years for this blending of objectives to take hold. Eventually, in 2015, a sustainability apex of sorts was reached when 193 UN member states agreed to the 2030 Sustainable Development Agenda and its 17 Sustainable Development Goals (SDGs). The SDGs are a universal call to action to end poverty, protect the planet and improve the lives of everyone, everywhere. They form a framework for national action and global cooperation for transformative change. Although the SDGs are not synonymous with 'sustainability', their international legitimacy permits them to function as a global, collective agenda and a reference point for progress towards 'sustainability'.

But a lot is needed to achieve the SDGs. First of all, effective politics and governance; secondly, considerable amounts of money; and thirdly – and this is where universities come in – knowledge. Just a year after the new Development Agenda was adopted, the University of Sussex set up its Sussex Sustainability Research Programme (SSRP), a partnership with its neighbour the Institute of Development Studies. New knowledge and new action were at the core of SSRP's mandate. With increasing climate impacts, biodiversity loss, energy supply shortages, pandemics, and ongoing inequity, hunger and poverty – research was, and is, needed more than ever on how to achieve the SDGs, and sustainability in general. How can sustainable development be realised under difficult conditions, and in an equitable way?

The University established SSRP as one of four new strategic research programmes and gave it the remit to catalyse and coordinate sustainability research on campus in conjunction with international and national partners. It took on the motto 'Science for the SDGs', and by academic year 2017-18, it was staffed and ready to go.

Consistent with sustainability values, SSRP research stood out as being mostly solutions-oriented and impact-focused, with heavy emphasis on place-based SDG related studies in low- and medium-income countries and the UK. It carries out these studies not for local researchers and stakeholders, *but with them*. Over 60 seeded projects have blossomed into more than 30 externally financed efforts. SSRP research has led to positive impact, and genuine, transformative changes on the ground, in more than 30 countries in the Global South and the UK. This report describes many of these impacts: establishing a public health clinic in the forests of Papua New Guinea; helping to set up a new network for advancing

▶ **Left to right: SSRP researchers Professor Mika Peck, Dr Emanuela Orlando, Dr Perpetua Kirby, Professor Fiona Mathews, and Dr Rebecca Webb at the SSRP Symposium 2024. Image credit: Stuart Robinson**

[1] SSRP provides research, communications and engagement support to all of its projects, large and small, for enhancing their academic and societal impact. Examples: seed funds for new projects; impact funds; visiting fellowship funds; coordination of input to Parliamentary inquiries; promotion of research findings via its website, social media, newsletters and other comms channels; workshops; symposia; conferences; webinars; exhibitions and other events; policy briefs; special issues of journals; REF support (Research Excellence Framework); and more.

sustainability issues on the South Coast of England; helping to protect the territory of indigenous people in the rainforests of Ecuador by providing scientific input into landmark court cases; and many other examples.

Not only has the work of SSRP been important, but how it does this work. From the beginning the SSRP has not been your standard top-down research institute but has developed a research culture compatible with its sustainability aims. It is 'bottom-up' and an 'open tent', in the sense that its priorities are driven by its researchers, and that it's open to the participation of all individuals in all departments, and provides ongoing support of these researchers1. And it gives great attention to fulfilling the University's huge potential for cross-campus collaborations by engaging researchers from all of Sussex's schools and 20 of its departments. These cross-school collaborations have helped it to achieve a very high level of interdisciplinarity: medical researchers collaborate with ecologists, anthropologists with biologists, physicists with climatologists.

Interdisciplinary collaboration has been a major factor in making the SSRP a crucible for innovative ideas related to the SDGs and sustainability. It has developed new ideas for combining nature conservation with public health provision; for making early warning systems more useful to vulnerable communities on the ground; and has identified previously unnoticed links between poverty, droughts and the success of HIV treatments. In particular, SSRP researchers have shown international leadership as advocates of an *integrative approach to achieving the SDGs that leaves no one behind* – integrative in the sense that reinforcing relationships among SDGs are considered in developing policies.

This idea of an integrative approach was elaborated by SSRP researchers in 2020 in a collection of 11 articles in the **Sustainability Science journal**, a year later as the theme of a high-profile international conference '**Evidence for Action**', and in a 2025 report published with the UK Foreign Office on *Synergy drivers for accelerating the SDGs*. The integrative approach has been developed and presented by SSRP researchers at the United Nations and other international forums, in UK Parliamentary documents, and is a foundation of its research work.

And now, after all this, we find ourselves in a new era of pushback to the sustainability agenda, where the development and environmental objectives of sustainability are actively challenged. It's time to adapt to this new reality, but also to be stubborn. It's time to insist that going backwards to even greater inequity and environmental crisis is not an option. The only sensible way is forward to a positive future, spurred on by sustainability research.

SSRP BY THE NUMBERS

£12.8M
awarded on 41 external grants (Sussex and IDS)

£1.85M
awarded on 42 fully funded SSRP projects

£440k
awarded on 21 partially funded SSRP projects

17
projects supported by the SSRP Impact Fund – £52,600

380+
SSRP affiliates

120
SSRP fellows

30+
countries with SSRP projects

265
publications

95+
events held

REF 2021

The **Sussex Sustainability Research Programme** (SSRP) contributed to the position of Sussex as a university conducting research of 'world-leading' quality and 'sustainability research with impact' through its support of several impact case studies submitted by the University to the REF 2021.

1. **Protecting pollinators: influencing policy and retail to reduce and remove harmful pesticides** by Professor Dave Goulson (School of Life Sciences) and Professor Liz Hill (School of Life Sciences)
2. **Establishing conservation, economic and health initiatives in local communities in Papua New Guinea and Ecuador** by Professor Mika Peck (School of Life Sciences), Professor Alan Stewart (School of Life Sciences) and Dr Jo Middleton (Brighton and Sussex Medical School)
3. **Building climate resilience in Africa by enhancing anticipatory risk management** by Professor Martin Todd (School of Global Studies), Dr Pedram Rowhani (School of Global Studies), Professor Seb Oliver (School of Mathematical and Physical Sciences)
4. **Shaping UK and EU trade policy and legislation** by Professor Emily Lydgate (School of Law, Politics and Sociology)

RESEARCH IMPACT

Seven years of innovative, international, interdisciplinary sustainability research making impact in the media and supporting effective policy changes.

2019

The Telegraph featured Professor Martin Todd and Dr Mohammad Shamsudduha's research on how severe floods brought about by climate change in sub-Saharan Africa replenish groundwater supplies, thereby strengthening resilience to drought in the region.

2020

Dr Pedram Rowhani appeared on Kenya's **Switch TV News**, explaining how early warning systems can forecast extreme weather conditions, protecting the livelihoods of pastoral communities in the Greater Horn of Africa.

Research co-led by environmental justice specialist Dr Mary Menton, which showed murders of environmental activists had doubled around the world in 15 years, was covered by national media outlets including ***The Guardian*** and ***Newsweek***.

With the spread of Covid-19, Dr Menton was quoted in an extended **BBC article** about the indigenous communities that have long warned of the links between environmental degradation and devastating disease.

2021

The Metro ran a short summary of a report co-published by Sussex researchers including SSRP Director Professor Joseph Alcamo, which stressed the importance of aligning the Sustainable Development Goals (SDGs) on climate and poverty in order to mitigate environmental impacts in a fair and equitable way.

Research led by Dr Beth Nichols that found that the average allotment is roughly as productive as a conventional farm – while using far less toxic chemicals – attracted the interest of several national newspapers including ***The Daily Mail***, ***The Times*** and ***The Guardian***, as well as BBC Radio 2 and 4, BBC Radio Sussex and Times Radio. In the media reports, Dr Nichols said her findings showed that local allotments could help reduce the UK's reliance on carbon-intensive foreign imports.

SSRP researcher Professor Mika Peck contributed to a landmark ruling in which Ecuador became the first nation in the world to use 'Rights of Nature' legislation to protect forests from mining – in this case the Los Cedros Protected Forest.

2022

Professor Dave Goulson's eighth book 'Silent Earth: Averting the Insect Apocalypse', a Sunday Times Bestseller, was shortlisted for the Wainwright Prize for nature writing.

Fiona Marshall won the Financial Times ***'Academic research award: smart ideas with real-world impact'*** for work that directly influenced national policy and developed decentralised approaches for sustainable waste management in Indian cities – protecting not only the environment but also the livelihoods and health of citizens.

2023

SSRP and the Government of Ghana convened an official side event at the High-Level Political Forum on Sustainable Development, an annual meeting of governments and experts held by the UN General Assembly in New York to review progress on the SDGs. Ghanian government ministers and SSRP Director Joseph Alcamo gave keynote addresses at the side event which focused on priorities for reaching SDG 6 – 'Clean Water and Sanitation'.

Professor Dave Goulson gave evidence to a Science, Innovation and Technology committee in the UK Parliament on the topic of 'insect decline and UK food security'.

2024

ITV News, **BBC News** and ***The Independent*** covered the initial data from our project documenting the recovery of the Sussex coastal ecosystem since a trawling ban in 2021. Lead researchers Dr Valentina Scarponi, Professor Mika Peck and PhD student Alice Clark made use of underwater camera technology to uncover 81 marine species in the Sussex waters, including endangered creatures like the European eel and the Tope shark. The press articles included footage of this underwater activity.

The 'Ripple Effect' project, which uses citizen science to monitor levels of pollution and biodiversity in the Upper River Medway, was the subject of an in-depth broadcast feature on BBC South Today and BBC Breakfast, and an accompanying **news article**.

BBC News spoke to researchers Professor Fiona Mathews and Dr Joanna Smallwood about their work protecting the Andean bear and its habitat in Ecuador. The coverage was timed to coincide with the release of the third film in the much-loved Paddington franchise, *Paddington in Peru*, as Paddington himself is an Andean bear.

2025

SSRP Director launched a report on Synergy Drivers for the SDGs at a meeting of the Foreign and Commonwealth Development Office.

The Ripple Effect and Documenting the Recovery of the Sussex Coastal Ecosystem projects were both showcased at a reception in parliament hosted by James MacCleary MP.

ECOSYSTEMS, RIGHTS AND JUSTICE

One of the unique contributions of the SSRP to research and policy has been to combine cutting-edge issues of biodiversity conservation with emerging ideas about human rights and the rights of nature.

These concepts have been linked and used to protect indigenous people, and the nature-rich territories where they live, from extractive industries.

Our research on this theme has challenged and changed human-centric understandings of the natural world. Far from viewing nature as a mere resource ripe for human exploitation, our researchers have worked tirelessly to secure legal protections for natural sites worldwide and the populations who inhabit them. The idea of nature having legal rights has progressed and is now entrenched in law in many parts of the world. The SSRP has contributed to advancing biodiversity and human rights research in the Global South, especially in South American countries.

Sustainable Development Goals:

FIND OUT MORE

Read about research in our 'Ecosystems, Rights and Justice' theme

Equitable and sustainable forest restoration in the Ecuadorian Andes

Ecuador is an ecologically diverse region with one of the fastest deforestation rates in the world. Uniting biological and legal expertise, Professor Fiona Mathews, Dr Joanna Smallwood, Dr Evan Killick and Dr Maria Clara Castellanos have worked to simultaneously strengthen forest conservation and protect local livelihoods in the 'Andean Bear Corridor' – a designated ecological region stretching across the Andes, encompassing protected lands and distinct ecosystems. Most of the deforestation in this vital biodiversity hotspot is driven by small-scale farmers simply trying to make a living. The Environmental Ministry of Ecuador requires a formal agreement that any landowners restore 60 per cent of the land area to forest. Currently, the SSRP research team is working diligently to secure official land titles for people in this community, giving them ownership over their own land. Strengthening the workers' territorial rights in this way will positively impact the forests of the area, and the species that call them home, such as the Andean bear (the real-life Paddington bear) and the critically endangered white-fronted capuchin monkey.

◀ Left: An Andean Bear snapped by a camera trap as part of an SSRP project in the Ecuadorian Andes. Image credit: Fiona Mathews

Tuning into songs of the forest: soundscapes and eco-cultural conservation in Kawsak Sacha, Ecuador

Ecuador has emerged as an epicentre of SSRP research because it epitomises some of the environmental and human rights issues faced by many regions and populations around the world. Led by in-country collaborator and Sussex PhD graduate, Dr Paola Moscoso, with support from Professor Alice Eldridge, Professor Mika Peck and Dr Patta Scott-Villiers, this project foregrounds the ecocultural value of the acoustic environment, or soundscape, as a vehicle for ecocultural heritage and protection. The ecocultural significance of the rainforest ambience to its indigenous inhabitants was articulated using creative participatory methods such as sound mapping, field recordings, illustration, and film-making workshops. This unique approach aims to celebrate and protect the ecocultural heritage of the indigenous communities who live there. The project resulted in the production of a documentary film and a set of illustrations that are used to promote the activities of the Ancestral Kichwa Population of Kawsak, PAKKS, and their heritage. It was successful in registering the soundscape as a national intangible cultural heritage.

Indigenous visions for rights-based approaches to sustainability

Dr Evan Killick led a project supporting indigenous rights in the Peruvian and Brazilian Amazon. This project had a range of outputs, including contributing to an online map of indigenous rights violations in the region and supporting indigenous students to document and analyse environmental issues in their own communities. The project's overall aim was to build a body of evidence that supports the protection of these threatened populations. A related project in the same region took the work forward to involve indigenous people in forms of environmental governance, strengthening the participatory and democratic potential of these peoples to determine the management and maintenance of their homelands.

▲ Top: A member of the Pueblo Ancestral Kichwa Kawsak Sacha indigenous organisation in Ecuador. Image credit: Alice Eldridge

◀ Left: Professor Fiona Mathews and local collaborators in the Ecuadorian Andes. Image credit: Fiona Mathews

Revisioning territorial rights in Brazil in the face of resource extraction

SSRP-supported research takes an interdisciplinary approach to land-tenure issues impacting indigenous and traditional communities, with many of these projects based in South America. In Brazil, a project led by Dr Bonnie Holligan, Dr Alex Shankland, and Dr Anabel Marin has combined law and anthropology expertise to establish legal frameworks to strengthen land rights in Brazil. The researchers have worked with partners in Brazil to secure territorial rights for traditional communities in Minas Gerais, a state rich in minerals required for the green-energy transition. Holding focus groups and workshops with representatives from the affected communities, the SSRP team is raising awareness about the precarious situation of these people and engaging with the Brazilian government to secure positive change.

Sustainable supply chain development in forest communities

Consumers may be unaware of the extent to which everyday products are linked to deforestation. Tracing the supply chains of timber going into household furniture, or the soy going to animal feed, has been the focus of a number of SSRP projects led by Dr Anthony Alexander.

Starting in 2018, SSRP first supported a project, employing postdoctoral researcher, Dr Izabela Delabre, to investigate the economic and social context of forest frontier regions in Peru and Brazil and their links to global markets. This initial project led to an ESRC grant on using SDG indicators as a measure of rural development, and then a further European Space Agency grant on linking satellite imaging with company supply chain regulations to trace exports. In 2024, Dr Alexander received further SSRP funding to work with colleagues in the School of Law, Politics and Sociology on new EU and UK mandatory regulations for supply chain due diligence on deforestation.

Co-investigators on these projects have included Dr Pedram Rowhani and Dr Alexander Antonarakis in the School of Global Studies, Dr Emanuela Orlando in the School of Law, Politics and Sociology, and Dr Wei Shen in the Institute of Development Studies, plus a wide range of industry, government and NGO research partners.

Supporting social, environmental and economic sustainability in the Costa Rican coffee industry

Environmental degradation and social injustice exist in many parts of the world. In Costa Rica, Dr Evan Killick has led a project supporting the social, economic and environmental sustainability of the coffee industry. Working in partnership with the national, government-backed Instituto del Café de Costa Rica, (iCAFE), the project has analysed the outcomes of current trends in 'direct trade' between international buyers and individual producers. The project team, and especially postdoctoral researcher Dr Layla Zaglul Ruiz, organised workshops to bring together stakeholders in the coffee industry and discuss the use of technology for communicating with buyers.

Subsistence poaching in Wildlife Protected Areas: the scope and limitations of transactional controls in Zambia

In Zambia, widespread poaching in Protected Areas has threatened biodiversity. The Zambian government has proposed alternative livelihoods to minimise ecological degradation, including fish farming and beekeeping. Professor Fiona Mathews and Professor Elizabeth Harrison have embarked on a review of the impact of these suggested alternatives – particularly those proposed in formal agreements – and their potential to reduce poaching. Looking particularly at fish-farming initiatives at the Kasanka National Park in Zambia, the project has laid the groundwork for longer-term research on the social and ecological consequences of such agreements.

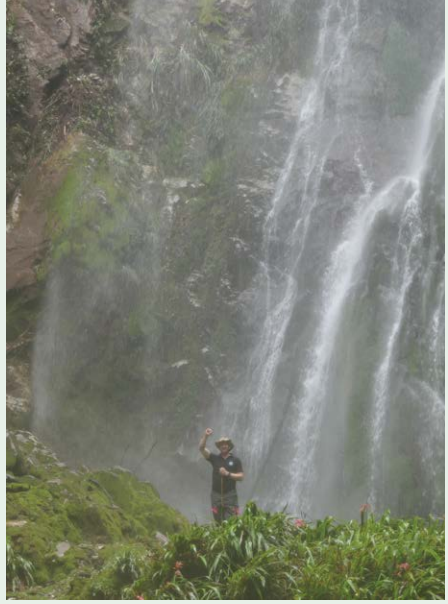
Mapping the 'violence footprint' of UK-listed companies and their operations in Cambodia

Dr Paul Gilbert's project involved working with Not1More (N1M) to create an online database revealing the 'violence footprint' of UK-listed companies in Cambodia. Focusing on companies operating in the forestry, agribusiness and mining sectors, the project has spawned a comprehensive database and visualisation tool mapping these companies' impacts on the land and people of Cambodia.

Working in collaboration with N1M, the Cambodian Youth Network and other human rights NGOs in Cambodia, Dr Gilbert organised training for activists and researchers looking to 'follow the money'. In addition, as part of this project, N1M's Mariëlle van Es, Fran Lambrick, Vedtey Ngoun and Esme Staunton Howe published a short report briefing academics and policymakers on the importance of monitoring the exploitative practices of UK-listed companies.

▲ A panoramic view of a Peruvian forest. Image credit: Anthony Alexander

Biodiversity protection and the rights of nature



Professor Mika Peck made a significant contribution to a landmark 2021 ruling in which Ecuador became the first nation to use 'rights of nature' legislation to protect the Los Cedros forest – one of the most biologically diverse habitats in the world – from industrial mining. He provided ecological data as supplementary evidence in the legal case, heard at the Constitutional Court of Ecuador, describing the importance of Los Cedros for critically endangered species.

In response to the challenges highlighted by the Los Cedros case, Professor Mika Peck founded Ecoforensic in 2022 – a non-profit Community Interest Company (CIC) that empowers indigenous and local communities to protect their ecosystems using the rights of nature legal framework. Built on more than two decades of ecological research and community collaboration in Ecuador by Professor Peck, from its inception Ecoforensic has continued to receive support from the SSRP.

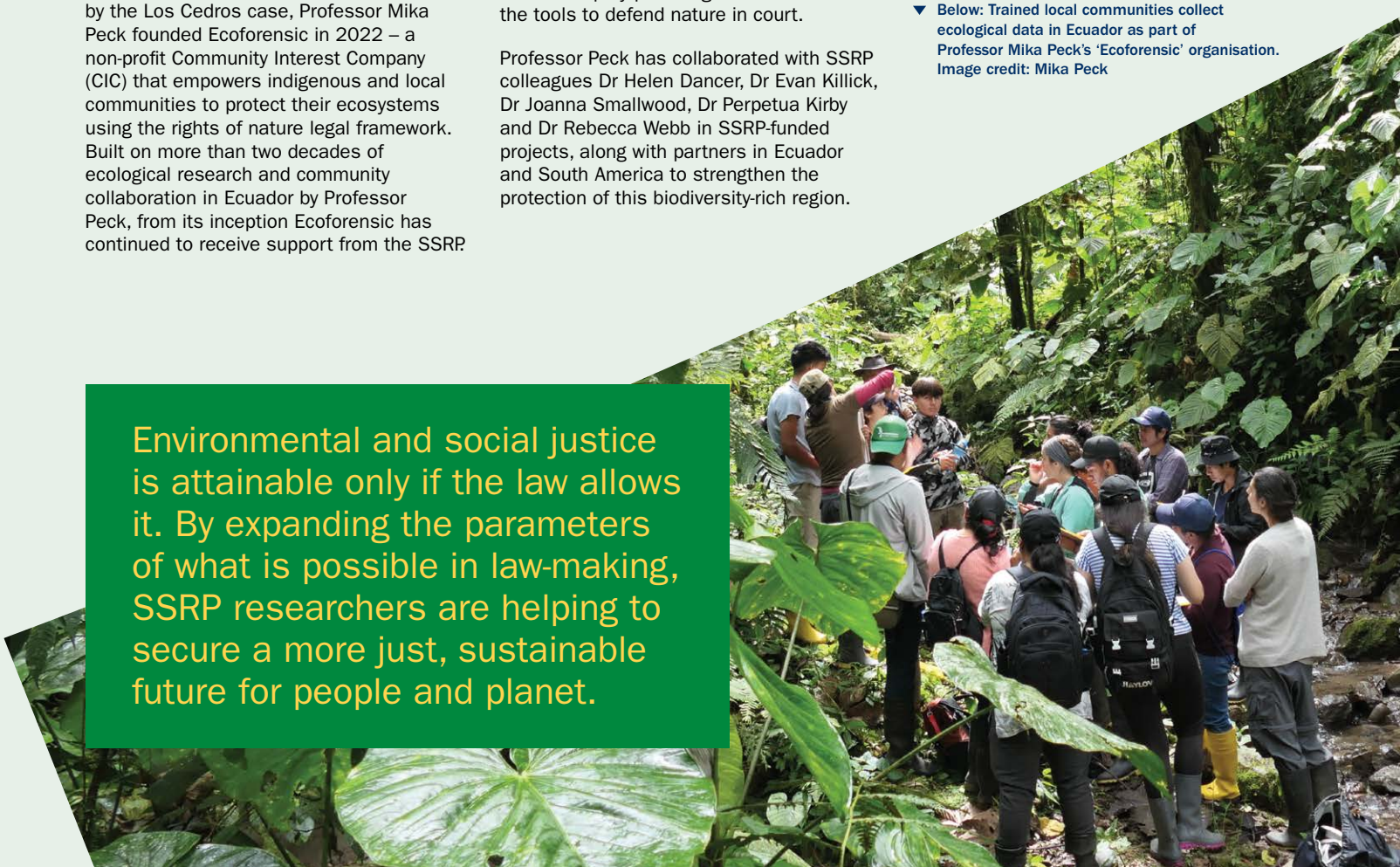
The organisation addresses the urgent need for accessible scientific expertise in environmental legal cases by training 'paraecologists' – local community members equipped to gather ecological data, critical to protecting their ecosystems. The information generated, known as 'ecological forensics,' a term coined by Professor Peck, bridges the gap between science and legal advocacy. Ecoforensic plays a critical role in bringing the rights of nature into practice and in promoting long-term, community-led environmental stewardship by providing communities with the tools to defend nature in court.

Professor Peck has collaborated with SSRP colleagues Dr Helen Dancer, Dr Evan Killick, Dr Joanna Smallwood, Dr Perpetua Kirby and Dr Rebecca Webb in SSRP-funded projects, along with partners in Ecuador and South America to strengthen the protection of this biodiversity-rich region.

Environmental and social justice is attainable only if the law allows it. By expanding the parameters of what is possible in law-making, SSRP researchers are helping to secure a more just, sustainable future for people and planet.

▲ Top: Professor Mika Peck in Ecuador. Image credit: Mika Peck

▼ Below: Trained local communities collect ecological data in Ecuador as part of Professor Mika Peck's 'Ecoforensic' organisation. Image credit: Mika Peck



Environmental and social justice is attainable only if the law allows it. By expanding the parameters of what is possible in law-making, SSRP researchers are helping to secure a more just, sustainable future for people and planet.

SUSTAINABILITY FRONTIERS

Climate and ecological crises are changing the way we perceive and engage with the world around us.

Research in this theme foregrounds new ways of thinking about sustainability and the problems and opportunities that arise from this precarious moment, in fields such as education, trade and finance.

We examine how we should approach the seismic challenges posed by climate change and environmental degradation. These issues affect every area of society, from education to business and finance. SSRP researchers are meeting these challenges in innovative and impactful ways.

Sustainable Development Goals:

Achieving sustainable trade post-Brexit: the UK and beyond

The UK's exit from the European Union raised urgent questions about the future of its trade agreements with other countries. In response, Professor Emily Lydgate and Dr Rob Amos, previously a Research Fellow in Law, have investigated how the principles of sustainability can be embedded into the UK's trade relationships with EU nations and other partners. They focused particularly on the Sustainability Impact Assessment (SIA) – the process through which environmental, economic and social impacts of free trade agreements are identified. They produced a policy brief outlining the context of their research and giving recommendations about how sustainability can be incorporated into post-Brexit trade deals, with additional involvement from the public. This project produced an academic **publication** that has been cited 62 times.

SDG 17++: managing cross disciplinary trade-offs for sustainable development

Throughout its lifespan, the SSRP has been a testament to the value of interdisciplinary sustainability research. However, the dynamics within these research collaborations can be complex and multifaceted. Accordingly, Professor Ann Light and SSRP colleagues Dr Emile Devereaux, Dr Piera Morlacchi, Professor Fiona Marshall, and Dr Eric Kasper (previously at Sussex) – along with research fellows Dr Sabine Hielscher and Dr Rose Cairns – have examined the conflicts that can arise from the intersectionality of SDGs.

They have sought to understand how interdisciplinary sustainability research teams shape sustainability research, and the implications for sustainability policy and practice. After holding workshops bringing together academics across fields, they found that introducing creative practitioners and civil society groups can widen the scope of sustainability research and enhance engagement with sustainable development.

Blockchains for sustainability

Advancements in information technology are creating new possibilities for collecting data on a range of sustainability issues, including decentralised energy production, carbon emissions, pollution levels and metrics on resilience to climate change impacts. A project led by Dr Eric Kasper (previously at Sussex) and Professor Paul Nightingale has argued, however, that it is essential to consider how and by whom these technologies are deployed, to ensure they are not purely in the hands of a few powerful actors.

The researchers have built a network of experts, researchers and citizens to enhance the inclusivity and accessibility of such technology, focusing particularly on blockchain – the most popular way to buy, sell and trade cryptocurrency. They have held workshops in India to expand public understanding of blockchain and consider how to incorporate a democratic model of blockchain into sustainability agendas. This research has fed into an ongoing EU-funded project on how to make 'smart cities' in India more inclusive.

FIND OUT MORE

Read about research in our 'Sustainability Frontiers' theme'

Financial crises and environmental sustainability

Financial crises play a critical role in the implementation of SDGs. Professor Andreas Antoniades and Dr Alexander Antonarakis have developed an analytical framework to assess how financial stress impacts the interaction between multidimensional poverty and environmental sustainability, focusing on air pollution, deforestation and biodiversity.

Their research suggests that countries facing financial crises often prioritise short-term economic benefits that usually exacerbate the social and environmental challenges, impacts and costs they face. Furthermore, the slower global economic growth experienced after the Global Financial Crisis of 2008/9 has caused socioenvironmental harm without producing green dividends.

In collaboration with the UNDP-UNEP Poverty-Environment Action for Sustainable Development Goals and the United Nations Research Institute for Social Development (UNRISD), they hosted a webinar and series of publications analysing the implications of rising financial stress in the context of Covid-19 recovery and sustainability transition. A key conclusion of the project is that rethinking our policy responses to financial crises is essential for managing sustainability transitions.

◀ Far left: A child embraces nature in an Ecuadorian rainforest. Image credit: Perpetua Kirby

▲ Top: Copies of Professor Andreas Antoniades and Dr Alexander Antonarakis's edited book about financial crises, poverty, and environmental sustainability

◀ Left: Children tune into the sounds of nature in Sussex. Image Credit: Tunde Alabi-Hundeyin

Creativity, sustainability and education

Children and young people will be at the front line of climate change over the next few decades, so sustainable development must work towards safeguarding their future. A large part of this effort is to engage and empower them regarding environmental and sustainability issues.

SSRP researchers have combined creative methods and sustainability and development research to generate this engagement in the UK and developing countries. Dr Joseph Walton and Professor Peter Newell have raised awareness about climate action in Ugandan schoolchildren.

Collaborating with the Ugandan science fiction author Dilman Dila, the researchers developed an educational game, drawing on Dr Walton's knowledge of storytelling and gameplaying and Professor Newell's world-leading research on political economy and sustainability transitions. The game was trialled in four Ugandan secondary schools. Dr Walton is now working with Sussex colleagues including SSRP's Dr Perpetua Kirby to develop a role-playing sustainability game in which the localised decisions of players affect a global state.

Creativity is also at the heart of Dr Kirby and Dr Rebecca Webb's research. Working with educators and pupils in India, Ecuador and the UK, Dr Kirby, Dr Webb and colleagues including Professor Mika Peck, Professor Michael Jonik, Dr John Parry, Professor Simon Thompson and Professor Vinita Damodaran have embraced uncertainty in sustainability education. Their pedagogical approach is based around allowing pupils to acknowledge the uncertainties of climate change and the future, while developing a sense of hope and agency in the face of environmental crises. The workshops Dr Kirby and Dr Webb have held in schools on three continents have foregrounded artistic methods such as creative writing, visual

art and film storytelling, enabling pupils to imaginatively engage with sustainability issues and develop their own unique worldview.

Any teacher, parent or guardian will know all too well the disruption caused by Covid-19 to education. Dr Kirby and Dr Webb collaborated with schools in Brighton & Hove and Lewes in the aftermath of the first waves of Covid-19, enabling educators to reflect on the impact of the pandemic on schools and reimagine what sustainability education might look like going forward. Again, their emphasis was on the uncertainty brought about by both pandemics and climate change. Among the activities undertaken by schoolchildren in this project were: immersive acoustic experiences of local sites, such as the University of Sussex Forest Food Garden (more on this below) and the Living Coast UNESCO biosphere; writing workshops led by a journalist from *New Scientist magazine*; and drama sessions based around sustainability issues.

The innovative methods and international partnerships that SSRP researchers foster help young people approach sustainability and climate change without fear but with creativity, imagination, and hope.

> ‘We aim to create a challenging educational space, where teachers are asking students to engage with something that’s difficult – to engage with ideas, thoughts, and their own experiences.’
>
> Dr Perpetua Kirby

◀ **Left: A workshop held to engage Ugandan schoolchildren with climate change through gameplaying. Image credit: Jo Walton**

▼ **Below: A creative workshop with Sussex schoolchildren exploring themes of sustainability and uncertainty. Image credit: Perpetua Kirby**

Sowing the seeds of sustainable futures

Dr Perpetua Kirby and **Dr Rebecca Webb** are lecturers in the School of Education and Social Work. Their research focuses on sustainability education for children and young people, with an emphasis on creative methods and notions of uncertainty. They tell us more about this research area and how SSRP has supported their work and careers, including their incredible forest food garden module.

What was your initial involvement with SSRP?

Rebecca: Perpetua and I came together because we were both educational ethnographers, coming from backgrounds of thinking about student participation and sustainability education. Our initial contact was serendipitous, as I was talking to a colleague about our work, and they said, 'you should talk to my friend and colleague Professor Joseph Alcamo'.

So, we excitedly went to meet Joe. Through his carefully crafted questions to us, it became apparent that we were a little confused about what exactly we were asking of him. His questioning was really helpful. We should have been much better prepared. And we needed to be much tighter and more convincing in translating our educational philosophical concerns into the practical every day.

Perpetua: We took our time to work on a funding proposal, that was funded by the SSRP as a project with colleagues in India and Ecuador. This was concerned with how young people might respond to current climatic and ecological challenges for which the solutions were as-yet unknown.

Tell us about the Forest Food Garden.

Perpetua: The Forest Food Garden is a module for second-year undergraduate students who create a forest food garden on campus. The educational philosophical work that Rebecca and I do informs the focus on uncertainty in the design and implementation of a garden that has value now and in the future. Colleagues from across the University lend their expertise to the teaching on the module, which requires students to think with diverse disciplinary knowledge, as well as their own cultural histories and experiences of growing and eating, to design aspects of the garden. They pass these on to the next cohort to implement the designs.

For instance, this year's students are designing species habitats and next year's will build them. Last year's students designed a nuttery that this year's students are planting. In the module, we talk about our indebtedness to those who came before, whether that's the legacies of colonialism, local shepherding heritages, or the microscopic skeletons of plankton that form the chalk of the South Downs. We focus on the human and the more-than-human. This term, we're looking at our indebtedness to those who come after, the as-yet unborn, as the students begin their designs for the garden.

> “We are indebted to the SSRP. It provided us a community of colleagues across the University, at a time when climate change and ecological disaster can leave us grieving and feeling desperately alone.”
>
> Dr Perpetua Kirby and Dr Rebecca Webb

As the writer Rebecca Solnit puts it, ‘being on the side of plants means being on the side of the future’. And our students will also be designing educational resources for school students that engage them in climate and ecological uncertainties.

Rebecca: There’s now a Forest Garden Society, with their own radio programme. For the radio show, five students take a theme each week, for example fungi, and each pick music on that theme. The Society have also put on a festival in the garden, which 200 people attended in Welcome Week.

How has SSRP helped or supported your research?

Rebecca: There are two major ways the SSRP has supported our research. The first is interdisciplinarity – just the range of colleagues that we work with, from the Brighton and Sussex Medical School right across the sciences and social sciences, as well as media, arts and humanities. We collaborated with Professor Alice Eldridge, for example, on a project about birdsong in the woods for the 2024 Brighton Festival [Birdbath]. There’s also the local-global connection. It’s taken us away from the feeling that we’re only little local researchers. The SSRP has given us the capacity to link to global colleagues.

Perpetua: We are indebted to the SSRP. It provided us a community of colleagues across the University, at a time when climate change and ecological disaster can leave us grieving and feeling desperately alone. Fostering such community endeavours is key to addressing the challenges.

◀ Left: Volunteers contribute to the planting of a nuttery at the Sussex Forest Food Garden. Image credit: Stuart Robinson

▲ Top: Dr Rebecca Webb (left) and Dr Perpetua Kirby (right) at the Forest Food Garden. Photo: Stuart Robinson

▼ Below: Students take part in the nuttery planting at the Forest Food Garden. Photo: Stuart Robinson

SSRP RESEARCH AROUND THE WORLD

SSRP and our researchers are connected with diverse institutions in low- and middle-income countries around the world. These projects work with global partners to deliver sustainability research with impact.

SPOTLIGHT ON ACTIVITIES

2018

- **Symposium:** SSRP Symposium
- **Workshop:** Science for Implementing the Sustainable Development Goals workshop in Ghana
- **Meeting:** UN High Level Political Forum

2019

- **Symposium:** Governance for an integrative approach to the SDGs mini symposium
- **Workshop:** Supply Chain Management and the UN SDGs on deforestation and development workshop
- **Debate:** International Day of Forests Sustainability Debate

2020

- **Symposium:** SSRP Symposium 2020
- **Fellowship seminar:** 'Transforming food production and consumption for the post 2020 biodiversity agenda'
- **Webinar:** The Pandemic and Climate Change: how we interact with the environment webinar

2021

- **Conference:** Evidence for Action: Aligning the Climate and SDG Agendas Conference
- **Webinar:** Financial Crises, Poverty and Environmental Sustainability in the Context of SDGs and Covid-19 webinar
- **Symposium:** Evidence for Action: Aligning the Climate and SDG Agendas

2022

- **Project Launch:** Launch of SSRP's Mapping Database 'Sustainability Search'
- **Film Screening:** The power of paraecologists in protecting Pachamama seminar and film screening
- **Seminar:** COP27: 'Good COP, Bad COP? Accelerating climate action from below and above' seminar

2023

- **Symposium:** 6th Annual SSRP Symposium
- **Workshop:** SSRP/SHL workshop: 'Interdisciplinary AI for a Better World?'
- **SSRP/IDS exhibition:** 'Sustainability in times of conflict, crisis and uncertainty'
- **Early Career Impact in the Social Sciences and Global cluster:** Insights, career journeys and networking with and from Sussex sustainability researchers

2024

- **Seminars:** Wicked Sustainability Challenges seminar series
- **7th SSRP Symposium:** 'From the South Coast to South America and beyond'
- **Workshop:** AI for Improving Weather Warning Systems workshop
- **Giving nature a voice:** 'Rights of Nature" film screening and conversation with Malcolm Rogge and Mika Peck

2025

- **Exhibition:** Visualising South Coast Sustainability Exhibition
- **Summer of Research:** 'Food for thought: Exploring Food Research at Sussex'
- **Report launch:** The Synergy Drivers for the SDGs report, supported by the International Development Fund was launched at the UN HLPF in New York.

▲ Top: The SSRP Symposium 2018. Image credit: Stuart Robinson

▶ Right: The SSRP Symposium 2024. Image credit: Stuart Robinson

SOUTH COAST SUSTAINABILITY

Our research in this theme focuses on the South Coast of the UK, where the University of Sussex is based.

From equitable rewilding to responsible food systems and the restoration of waterways, our research is pointing the way to sustainable futures locally and globally.

While the majority of SSRP-supported research takes place outside the UK and is global in scope, we are also doing crucial work much closer to the University's home base. Projects in this theme focus on protecting the South Coast landscape and striving for sustainable futures for the region. We are proud to call Sussex home, and our research will continue to work towards allowing this beautiful part of the world to flourish.

Sustainable Development Goals:

Developing an ecosystem of business networks to support SMEs transition to the circular economy

Dr Shova Thapa Karki has collaborated with partners, including local government and organisations, to expand understanding of how small and medium enterprises (SMEs) can successfully transition to the circular economy, thereby meeting net-zero goals and strengthening economic resilience. The project has built an understanding of startups' and SMEs' engagement with circular actions. The project aims to build an 'ecosystem' of local business networks to support SMEs in the shift to the circular economy.

FIND OUT MORE

Read about research in our 'South Coast Sustainability' theme'

Understanding place-based knowledge and its boundaries for sustainability transitions

Collaborations between research teams, local partners and communities ensure that pathways to sustainable food systems are developed through bottom-up (rather than only top-down) processes, taking into consideration the particularities of place. This ethos is at the heart of Dr Shova Thapa Karki and Dr Bradley Parrish's project on the role of place-based knowledge in the processes of food production and consumption in East Sussex and Java, Indonesia. Dr Thapa Karki and Dr Parrish have hosted focus groups with various stakeholders in each location – farmers, tenants and estate owners, and environmental and land management organisations in Sussex; and chefs, community caterers, housewives and food activists in Java – to establish effective ways to integrate local knowledge into sustainable food systems.

People, pollinators and pesticides in peri-urban farming

Professor Dave Goulson and colleagues Professor Emily Lydgate, Professor Donald McGillivray, Dr Helena Howe, Professor Fiona Marshall, Professor Adrian Ely, Dr Rachael Durrant and Dr Pedram Rowhani have collaborated with growers of allotments and gardens in two distinct urban areas – Brighton and Kolkata, India – to collect data on the use of pollinators and pesticide in food production. The widespread presence of pesticides has huge implications for human and environmental health. Despite this, the research area is poorly monitored and regulated. The research team have found that urban food-growing in the UK would likely benefit urban communities, enabling the attainment of SDG 15 Life on Land as it provides a habitat and reduces environmental damage compared to conventional farming.

◀ Left: A research assistant holds kelp aloft during work for the SSRP project monitoring biodiversity off the Sussex coast. Image credit: Stuart Robinson

▲ Top: Dr Beth Nicholls takes a minute out of her research on pollinators and pesticides. Image credit: Beth Nicholls

▶ Right: A man waters the soil in a small scale peri-urban farm in Kolkata, India. Image credit: Dave Goulson

▲ Citizen scientists inspect samples from the River Medway as part of the 'Ripple Effect' project. Image credit: Ellen Rotheray

Ripple effect: a waterway resilience initiative

The grim state of UK waterways has come under intense scrutiny in recent years. Sussex is among the areas most affected by sewage and pollution. Dr Lucila Newell, Dr Ellen Rotheray and Professor Mika Peck are working with local NGO Friends of the River Medway and trained volunteers, using citizen science methods to assess biodiversity and pollution levels in the Upper River Medway. The team have discovered that pollution is above healthy parameters for rivers, particularly near sewage outflows. In addition to collecting this data, the team has also explored and defined the motivations of the volunteers as part of wider research on the importance of connection to nature as a pathway to sustainable behaviours.

Documenting the recovery of the Sussex inshore ecosystem

Over 96 percent of Sussex's kelp has been destroyed by human activity. This led to a trawling byelaw in 2021, which prohibits bottom-towed trawling gear in a 304 km^2 area along the Sussex coast. Since then, Dr Valentina Scarponi, Professor Mika Peck and PhD student Alice Clark have been inspecting biodiversity off the Sussex Coast. With the help of underwater camera technology, they have monitored and surveyed marine life. Initial findings identified 81 species inhabiting the coastline ecosystem, including endangered creatures such as the European eel and the Tope shark. Their study will inform policy decisions made around trawling and marine biodiversity conservation in Sussex and further afield.

Rewilding and nature recovery

Rewilding is one of the key solutions to climate and nature crises, and the SSRP has been at the forefront of research in this area.

One of our earliest projects, led by Dr Chris Sandom with Dr Adrian Ely, investigates the interrelation of meat production, biodiversity and wider ecosystem service provision in agricultural and nature conservation sites in the South East of England. It focuses on how rewilding strategies can be implemented without a cost to livelihoods or food production.

Examining a range of land-management approaches in the region, this interdisciplinary project has contributed to contemporary discussions around the UK's post-Brexit agricultural and environmental policies. Dr Sandom and Dr Ely have concluded that multi-use of the regional landscape (such as protected areas with and without access to pedestrians, livestock grazing, crop growing and gardening, recreational space) would be an equitable approach and provide multiple benefits.

Dr Sandom has also led another related project, with Dr John Thompson, Dr Bonnie Holligan, Dr Shova Thapa Karki and Dr Pedram Rowhani, investigating the competing interests of food security and biodiversity. This collaboration has entailed active participation by a range of local organisations and businesses such as the Brighton and Hove Food Partnership, Sussex Wildlife Trust, Knepp Wildland, the National Trust and the South Downs National Park, Southern Water and Shoreham Port. The project is establishing a Regional Research Hub that involves relevant partners conducting analysis and hosting workshops to identify the key needs and requirements for achieving sustainable land use systems.

Rewilding has gained attention as a way to restore nature and combat climate change, but it has often left farmers feeling excluded. Rewilding agricultural land seeks to create solutions that benefit both farming communities and food security while also delivering the land use changes needed to meet environmental goals. The Roots of Change project, led by Dr Lidia Cabral and involving Dr Sandom, Dr Thompson and Dr Rowhani, is bringing together key stakeholders in the South Coast region to explore practical agricultural wilding options. The findings will inform advocacy efforts, promoting agricultural wilding as a viable and fair solution at a critical time for farming and land-use policies at a local and national level.

Dr Sandom also founded Rewilding Sussex, a community group supporting nature recovery in Sussex, including projects on the University of Sussex campus such as Love Your Scrub, which aims to increase scrub habitat to enhance biodiversity and human wellbeing. The SSRP has also forged a productive partnership with Knepp Wildland, an internationally renowned rewilding project covering 1,400 hectares of former farmland in West Sussex. To mark World Rewilding Day and Sustainable Sussex Month, we organised a student field trip to Knepp in 2023, in which students attended workshops and spotted red and fallow deer, long-horn cattle and the UK's largest bird of prey, the white-tailed eagle.

University of Sussex students don binoculars during an SSRP field trip to the Knepp estate in West Sussex. Image credit: Chris Sandom

SUSTAINABLE CLIMATE AND FOOD SYSTEMS

Sustainable Development Goals:

There is a close relationship between climate and food. Climate hazards such as drought and extreme weather threaten food security, and local impacts can have global repercussions in terms of trade and supply chains.

SSRP research in this area investigates ways to strengthen resilience against such threats across continents, while striving towards universal accessibility to nutritious food.

Food is at the heart of numerous interrelated sustainability issues. Our research in this theme investigates the threats posed by climate change to food security, tensions between food production and biodiversity conservation, the ecological and social impacts of food supply chains, and potential solutions for sustainable agriculture.

Climate-resistant agriculture systems in sub-Saharan Africa

Working in Ethiopia, Kenya, Rwanda and Tanzania, Professor Peter Newell, Dr Lars Otto Naess, Dr John Thompson and postdoctoral researcher Olivia Taylor, with collaborators in those countries, have analysed the incentives and disincentives that lead state and market actors to commit to implementing more climate-resilient agricultural approaches and practices, increasingly under the banner of 'climate smart' agriculture.

The project has explored how countries with different governance systems handle the complex interface between food, energy, water and climate. To do this, the project team have examined the governance of the interface between agriculture and climate change across East Africa and the Horn of Africa – regions where the challenges of agricultural development in a changing climate are particularly acute. They have concluded that a better understanding of governance drivers and obstacles is urgently needed, particularly in poor countries where large populations have a high vulnerability to climate change and a strong dependency on agriculture-based livelihoods.

Prediction of food security crises and effective responses

Food security is a major challenge for many communities around the world, with weather and climate hazards having an increasingly significant impact on food production. This is certainly the case in East Africa and the Horn of Africa.

Professor Martin Todd has led a project with Dr Annemie Maertens, Dr Lars Otto Naess, Dr Pedram Rowhani and Professor Dominic Kniveton in partnership with national agencies in Kenya to develop improved forecasts of food security crises. Resilience to climate events like prolonged drought can be greatly strengthened by warning local communities, particularly pastoral workers, about these threats before they take hold. The researchers are now looking at how artificial intelligence can improve these early warning systems.

Tools for safe and sustainable artisanal fishing

Early warning of extreme climate events is also the central focus of another strand of research in Kerala, South India. Professor Filippo Osella has worked with Dr Max Martin, Dr Pedram Rowhani and Dr Kate Howland, and partners including the India Meteorological Department and the Kerala State Disaster Management Authority, to provide local fishers with accurate daily weather forecasts. This system increases the safety of fishers, improves the income of fishing households, and makes the fishing itself more sustainable, as fishers can go about their work in a more targeted, measured way.

The intersection between migration, food security, environmental challenges and livelihood strategies

Professor Farai Jena, Dr Julie Litchfield and Professor Priya Deshingkar have explored the issue of food security and its mitigation. Many households in developing countries use migration as a strategy to diversify their income and protect against potential shocks to income at home. Using empirical evidence obtained from households in Zimbabwe, the research team has analysed dietary diversity, and the share of household budgets spent on food expenditure, seeking to determine the impact of migration on food security. The team have recommended a more prominent place for migration among the SDGs.

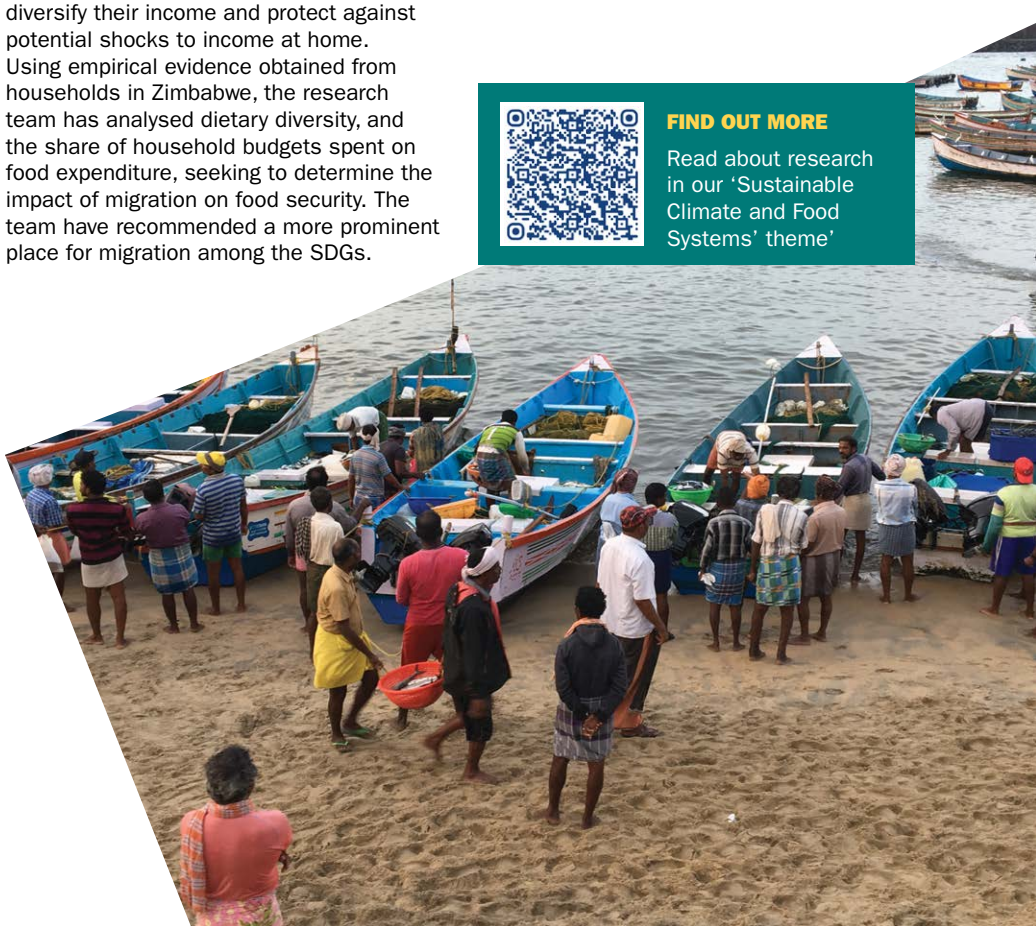
Agricultural voices in Northwest Syria

Dr Mirela Barbu and Professor Martin Spinelli came together to produce audio and video podcasts offering technical guidance to over 5,000 farmers and agricultural workers in post-conflict zones in Northwest Syria. The podcast is called 'Agricultural Voices Syria'. The podcast helps to disseminate information on how farmers can improve the quality of their agricultural outputs, reduce waste, and pursue more sustainable agricultural practices.

Before the Syrian Civil War, farmers received support from the state, but this disappeared during the conflict. Working with a local NGO called Syrian Academic Expertise (SAE), Dr Barbu and Professor Spinelli have stepped in to fill this knowledge gap. More recently, SAE has established a new agricultural development centre in which farmers can be trained in different sustainable agricultural methods.

FIND OUT MORE

Read about research in our 'Sustainable Climate and Food Systems' theme'



◀ Left: Members of the Isan charity providing agricultural aid in Syria. Image credit: Syrian Academic Expertise.

▶ Right: Fisherfolk take to their boats in Kerala, South India. Image credit: Filippo Osella

Development of API (Application Programming Interface) and visualisation tools to discover post-Covid changes in energy consumption

A project led by Dr Justyna Robinson with Professor Julie Weeds has examined changes in household energy consumption in the years after the peak of the Covid-19 pandemic. Seeking to track changes in energy use and waste and recycling behaviours post-Covid, Dr Robinson drew on the Mass Observation Project, an archive of diary-like records maintained by volunteers documenting their household habits. The project has produced a map, accessible from a search engine, visualising energy consumption and waste patterns across the UK.

The 'right to nutrition' in its social, legal and political context

Dr Jody Harris's project, with support from Dr Ruth Stirton, addresses the issue of malnutrition by advancing the distinct concept of a 'right to nutrition'. Dr Harris has canvassed international agencies and governments, civil society, legal professionals and local communities in Zambia and Sierra Leone to gauge their understanding of – and desire for – a concentrated 'right to nutrition' approach. The key objective of the project was to embed the 'right to nutrition' into research and policy action.

Groundwater futures in sub-Saharan Africa (GroFutures)

GroFutures is an interdisciplinary, collaborative research project involving researchers Dr John Thompson, Professor Martin Todd, Dr Imogen Bellwood-Howard, and partners in Ethiopia, Niger, Nigeria, Tanzania and the UK, which aims to develop the scientific basis and participatory management processes by which groundwater resources can be used sustainably to alleviate poverty. The project seeks to understand how groundwater can meet future demands for food, water and environmental services. The results have informed groundwater development policy and programming in the countries involved and directly influenced the design of a large research project on climate adaptation in tropical drylands (see below).

Climate adaptation and resilience in tropical drylands (CLARITY)

The CLARITY project builds on GroFutures (see above). It addresses the critical need to identify equitable, sustainable and climate-resilient development pathways in tropical drylands.

Dr John Thompson, Dr Imogen Bellwood-Howard and Professor Martin Todd have worked with several postdoctoral researchers, monitoring, evaluation and learning specialists and collaborators to establish 'Transformation Labs' (T-Labs) in Niger, Nigeria, Tanzania and India. These span a range of dryland settings and capture the complex challenges of rural and urban water resilience under rapid development.

The T-Labs are collaborative spaces where people take an active role in co-developing sustainable, equitable pathways. CLARITY is now analysing the equity, sustainability and resilience of these solutions to inform policy and practice.

▲ A pastoral worker attends to camels in Kenya. Image credit: Pedram Rowhani

Participatory democracy and solidarity-based food system transformations

SSRP food-related research and events over the last eight years have covered a range of topics. In July 2024, we were delighted to welcome Visiting Fellow Dr Miseong Cho, Senior Researcher at the Mosim and Salim Research Institute and Guest Lecturer at Seoul National University, who gave a fascinating insight into the Hansalim Life Movement – South Korea's biggest multi-stakeholder food cooperative.

Drawing on her first-hand research into the movement, Dr Cho explained how Hansalim offers an appetising alternative to the industrialised food systems and processed food that saturate modern Western society. From its roots in the pro-democracy movement in South Korea in the 1980s, Hansalim has grown into a collective of over 900,000 consumer members. The movement has engendered fair and equitable trade between consumers and local producers.

Dr Cho's seminar was in keeping with focus on sustainable food systems championed by the SSRP and the University of Sussex.

Other developments in this theme

We are proud to be part of the **UK Food Systems Centre for Doctoral Training** (UKFS-CDT), which will train over 65 doctoral students (2021-2027) to lead the UK towards a resilient, healthy and inclusive food future.

Our postgraduate researchers in this programme address questions around what we (should) eat, produce and manufacture, and what we (should) import, factoring in the complex interactions of health, environment and socioeconomic considerations.

In conjunction with postgraduate researcher Viola King-Forbes, we are currently in the process of establishing a Sussex Food Research Network, encompassing researchers from all disciplines and departments and expanding our research excellence in sustainable food systems.

Inclusive mapping and modelling for sustainable land use

Land use change, such as rapid urbanisation, is creating trade-offs and tensions between development, food security, and nature recovery goals. Revealing and communicating the nature and scale of these trade-offs, which are often ignored or invisible, is a key step towards sustainable multifunctional landscapes which will address the SDGs

But there are considerable difficulties. Typically, when we make or enact land use policy, evaluate ecosystem services, or assess vulnerability or resilience to climate change, we use landscape mapping and modelling to help inform our decisions. But multifunctional landscapes produce very different kinds of values. The same piece of land might produce crops with a clear market value, while providing an array of ecological and cultural services. There will often be both synergies and trade-offs between all the different goods and services these landscapes provide, which mainstream land management interventions can easily overlook. Complicating things further, these various 'benefits' will be recognised and prioritised by stakeholders differently, they would typically be measured at very different spatial scales, and will often accrue over very different timescales. As a result, there is a lack of approaches to effectively support inclusive, real time decision-making when it comes to multifunctional landscapes.

A programme of research that was seed funded by the SSRP, led by Professor Fiona Marshall, sought to fill this gap. A multi-disciplinary collaboration between from the University's Science Policy Research Unit (SPRU), the Predictive Analytics Lab (PAL) within its Informatics department, resulted in the development of the **LIMMMA platform**. LIMMMA (Landscape Integrative Mapping and Modelling for Multifunctional Analysis) is an online platform that enables users to generate and analyse Land Use Land Cover (LULC) maps from satellite imagery and a wide range of other sources, even in complex multifunctional landscape contexts where conventional methods often fail.

But these platforms are only as good as the data they rely on. That is why LIMMMA works best when it is part of the co-creation process in transdisciplinary action research, in combination with long term, deeply engaged, community based field work. We can then start to understand of the dynamics on the ground, and support democratised decision making processes which draw on multiple type of data and perspectives.

This research collaboration has proven to be a success story for the SSRP's ability to seed fund research programmes. The team, which includes Professor Fiona Marshall and Dr Jonathan Dolley from SPRU, and Professors Novi Quadrianto and Jeremy Reffin from Informatics, has continued to develop and use LIMMMA, in combination with policy analysis and deeply engaged field work, across several follow on research projects. These include "Inclusive Green Infrastructures for Urban Wellbeing" under the British Academy Urban Infrastructures of Well-being Programme, and Nature Returns (funded by the Joint Treasury Outcome Fund and led by Natural England).

It's latest project is LEAF Indonesia, funded by the Global Centre on Biodiversity for Climate. LEAF Indonesia explores how to support local governments, and communities in managing Indonesia's food estates inclusively and sustainably. It focuses on how food estates could potentially not only improve food security, but also preserve biodiversity, bolster climate resilience, and enhance livelihoods.

▶ Right: Participants of the LEAF Indonesia project at a workshop. Image credit: Fiona Marshall.

Sustainable agriculture in post-conflict zones in Syria

Dr Mirela Barbu (University of Sussex Business School) tells us about her research in Northwest Syria, including working with agricultural experts to produce podcasts for farmers amid the Syrian Civil War.

Dr Barbu, Professor Martin Spinelli, and their research partner, Dr Shaher Abdullateef of the Syrian Academic Expertise, won the 2021 Real Impact Interdisciplinary Research Award for their Agricultural Voices Syria podcast project.

▲ Top: Dr Mirela Barbu presents at the SSRP Symposium 2024. Image credit: Stuart Robinson

▶ A member of the Isan charity, a Syrian humanitarian organisation based in Turkey, which supports Syrians in various areas, including agriculture. Image credit: Syrian Academic Expertise

How did you start working in Syria?

I was collaborating with the Council for At-Risk Academics (Cara). They offer research opportunities to academics in countries in war, especially in post-conflict areas. They had a big Syrian programme, and in 2020 I was contacted by Cara to supervise three research projects on agricultural value chains. While supervising these projects, I read a lot about Syria and became passionate about it. It became clear to me that we needed to invent something to help Syrian farmers receive assistance and support.

Could you explain the context of agriculture in Syria?

Before the Civil War, Syrian farmers received a lot of support from the state. This disappeared during the war, though, and there was a huge need for these services to be continued. Because of the difficult conditions created by the war, it wasn't easy for us to visit and get to know the farmers. So, we thought, what can we do? This is how we came up with the idea for a podcast.

We called it **Agricultural Voices Syria**. I looked for an academic at Sussex who has expertise in podcasting, and this is how I met **Professor Martin Spinelli**, my research partner.

How did the podcast episodes come together, and how did you source the agricultural information?

The podcast provides advice about how to grow certain plants, what type of fertilisers to use, what chemicals to avoid, what to do with agricultural waste, how to recycle and create by-products. It also includes guidance on certain key commodities in Northwest Syria, such as wheat, olive oil and vegetables.

We worked with a Syrian NGO called **Syrian Academic Expertise**, a group of Syrian academics and experts from different fields including education and agriculture.

What have you been working on more recently?

In 2024 I was awarded an SSRP Impact Fund for a project with my colleague **Professor Natalia Slutskaya**. We organised a workshop in Gaziantep with members of the Ministry of Agriculture to understand the importance of sustainability for future agricultural development and the challenges of implementing sustainability in a post-conflict zone.

We're passionate about this work and want to keep going.

PLANETARY HEALTH

Research in this theme investigates the connection between environmental health and human health around the world.

Our projects have explored the intersections of ecological and human flourishing, showing how the wellbeing of people and planet is inextricably linked.

Within the theme, we can see how the degradation of the Earth has dire consequences for the health and wellbeing of humanity, particularly in the Global South, where the effects of climate change have most impact. Our research demonstrates various ways in which protecting our planet can enable human flourishing.

Our research into the interrelation of human and environmental health has entailed groundbreaking studies into menstrual health and HIV resistance.

Sustainable Development Goals:

Luna Connection: human rights and environmental implications of menstrual hygiene products

The 'Luna Connection' project, led by Dr Chi Eziefula (with Dr Anne Gatuguta, Dr Maria Federica Moscati, Professor Maya Unnithan, Dr Caroline Ackley and Professor Hayley MacGregor) explores the social, legal and environmental implications of menstrual health in Uganda, Kenya, Sudan and the UK. In collaboration with partners in these countries, Dr Eziefula established an interdisciplinary network to identify research gaps and examine the intersections of menstrual health, human rights and environmental sustainability. For instance, there are obstacles to accessing menstrual health products in deprived areas, and when available, these products are mostly single-use and made of plastics containing undisclosed chemicals, some of which may have an impact on hormonal health.

Dr Eziefula has studied initiatives in the African countries – particularly Uganda's menstrual health charter – and is exploring ways to improve menstrual health in the UK. This work has included visiting local schools to raise awareness of menstrual health, and holding talks and workshops to reduce stigma and improve knowledge of menstrual health for diverse audiences. Together with Dr Anne Gatuguta, she is a signatory to the Women's Environmental Network's campaign for a Menstrual Health and Dignity Act in the UK.

DROught, Poverty and HIV drug RESISTance (DROP-RESIST): threat to resilience in vulnerable rural settings

Socioeconomic and environmental factors can exacerbate existing health issues. Professor Collins Iwuji co-led a project with Dr Anne Roemer-Mahler, Professor Dominic Kniveton, Dr Sonja Ayeb-Karlsson, Professor Bobbie Farsides and Professor Hayley MacGregor exploring the relationship between drought and HIV drug resistance in the uMkhanyakude district of South Africa, where about 30 percent of the population are HIV positive.

The researchers have examined how the vulnerability created by drought and poor socioeconomic status affected people living with HIV. They have found that adherence to HIV treatment drops during drought periods and, while there is some recovery post-drought, adherence is still lower than before the drought. Moreover, women and children are the most affected demographics. Dr Iwuji and colleagues have made recommendations to the South African government, including improving information flow between different sectors: health, social welfare, disaster response, agriculture and the South African Weather Service.

The challenge of ageing with HIV in Africa: developing capability, partnerships and research on ageing and HIV in Zambia

HIV treatment has improved considerably over the last two decades. However, HIV/AIDS is still a major health issue around the world and has a particularly significant impact in sub-Saharan countries. This project, led by Professor Jaime Vera Roja, tackles the health and social challenges facing ageing people living with HIV in the region, particularly in Zambia. Data on healthcare outcomes for this demographic in Zambia are incomplete, so this project helps to fill a knowledge gap.

Dr Roja initiated a research partnership between the Department of Global Health and Infection at the Brighton and Sussex Medical School and the Centre for Infectious Diseases Research in Zambia (CIDRZ) in 2021. The partnership strengthened capacity for research, innovation and knowledge exchange around ageing and HIV in Zambia during the Covid-19 pandemic. This work has contributed towards a sharper definition of the health-related quality of life in ageing people living with HIV in Zambia.

◀ **Far left: The Wanang health clinic in Papua New Guinea, which SSRP researchers helped to establish. Image credit: Jo Middleton.**

▲ **Top: Dr Chi Eziefula (left) and Dr. Anne Gatuguta (right) speaking about their work on menstrual health at an International Women's Day event. Image credit: Chi Eziefula.**

▼ **Below: A local community in West Papua. Image credit: Mika Peck.**

Building global surveillance with local data: a sustainable response to antimicrobial resistance

Dr Anne Roemer-Mahler's research with Dr Leena Al-Hassan and Professor Hayley MacGregor explores the impact of antimicrobial resistance (AMR) in Egypt by charting the 'life-cycle' of AMR data produced in routine clinical practice.

Global AMR response is largely based on data from high-income countries, which leaves low- and middle-income countries vulnerable. There is potential for AMR to undermine sustainable development in these countries. Dr Roemer-Mahler's project addressed this gap by developing surveillance systems to track the management of clinical data in local healthcare facilities and the national health system of Egypt, to better understand how such knowledge is produced.

Covid-19 recovery: scoping an intervention in youth mental health support in the Global South

The Covid-19 pandemic amplified mental health problems, especially in children and adolescents. Dr Emma Newport led a project, with support from Dr Clio Berry, Dr Daniel Michelson and Professor Maya Unnithan, which identifies scalable psychological interventions for youth in Kenya.

This research emerged from a partnership between the University of Sussex and Youth Café Kenya, a global network that provides mental health support to over 50,000 young people in low-income nations. Ultimately, this project has produced a blueprint for online mental health support for young people in low-income countries.

Urban air pollution and inequalities in fast-industrialising countries: origins, nature and policy

Megacities around the world are often blighted by severe urban air pollution due to high vehicle and industrial emissions, threatening the quality of life of residents. Using Beijing and Delhi as case studies, Dr Wei Shen – with Dr Adrian Ely and Professor Lyla Mehta – has investigated the challenges faced by vulnerable and marginalised communities in fast-industrialising countries like China and India.

Dr Shen's comparative study examines the impact of air pollution on the health of low-income populations. The project aims to develop a more inclusive, fair and accountable policy regulation system, which addresses the inequalities associated with air pollution. By extension, this research sought to influence local policy-makers and enhance public awareness of this urban malaise.

FIND OUT MORE

Read about research in our 'Planetary Health' theme'

▲ Professor Mika Peck, furthest right, and collaborators in West Papua.

Human and environmental health protection

‘Our project has worked because it’s been an action-research partnership between forest peoples on the ground, SSRP, and an amazing generation of indigenous ecological and health researchers, many who’ve come to Sussex over the years for training.’

Dr Jo Middleton

Communities in remote areas often face obstacles to receiving adequate healthcare. A thread of research led by Professor Alan Stewart and Dr Jo Middleton (involving colleagues including SSRP researchers Dr Dominic Glover, Professor Mika Peck, Professor Jackie Cassell, Professor James Fairhead, Dr Andrea Brock and Dr Richard Hazell) has combined health provision and rainforest conservation in Papua New Guinea and Oceania.

Papua New Guinea (PNG) is home to the third-largest tropical rainforest on Earth, which contains around 8 percent of all the planet’s biodiversity. However, a quarter of PNG’s forests have been cleared or degraded, often by commercial loggers servicing global commodity demands. At the same time, PNG scores among the lowest countries in the world on SDG health indicators, with skin diseases (particularly scabies) rife in the population.

Logging companies offer roads and income, which can improve access to health services, but at a cost to forests and ecosystems. Successful conservation in the country thus requires a dual focus on health and biodiversity. The research team has, therefore, used biological, anthropological and medical methods to address these interrelated areas in the Wanang Conservation Area of PNG, focusing first on scabies and fungal diseases. They have concluded that the provision of health services can incentivise forest-dwelling communities to protect their forests rather than taking financial inducements from extractive industries.

Follow-up projects in the same thread have worked towards improving food security while protecting rainforest biodiversity and carbon stocks in indigenous communities recovering from the health and economic consequences of Covid-19 in PNG; and integrating conservation and public health in the upland forests of Bougainville and the lowlands forests of Sepu, PNG.

SSRP researchers are continuously developing their projects to positively impact the communities they work with, including securing external funding for further research.

▲ Top: Medics attend to a health emergency in Papua New Guinea. Image credit: Jo Middleton.

▶ Right: Local health workers outside the Wanang clinic in Papua New Guinea. Image credit: Jo Middleton.

DROught, Poverty and HIV drug RESISTance: threat to resilience in vulnerable rural settings

Professor Collins Iwuji is Professor of Global Health and HIV Medicine at the Brighton and Sussex Medical School and holds a faculty position in Population Science at the Africa Health Research Institute, South Africa. He tells us about his SSRP-funded research investigating the relationship between drought and HIV treatment and care in South Africa.

How would you describe your research background?

I'm an HIV physician, so my research initially focused on HIV treatment outcomes and adherence, HIV drug resistance, and how to improve treatment outcomes in people living with HIV.

How and why did your research move towards environmental and sustainability issues?

I was based in South Africa where I was undertaking HIV research, and the area I worked in, UMkhanyakude, was experiencing quite significant drought at the time. It was described as the worst since record-keeping began, resulting in the government declaring a state of disaster. People were queuing to get water. This is an area with high HIV prevalence – about 30 percent of the population are HIV positive. Looking at these queues, I was thinking that about three out of 10 people in that queue would need to be in clinics for their repeat HIV medications. Because water was in short supply, though, some people would miss their appointments.

You interviewed people who had both dropped out of, and remained in, HIV care during the drought for your research. What did these interviews tell you?

The predominant theme of the interviews was that economic reasons like food insecurity provided an obstacle to HIV treatment. For instance, people did not want to take their medication on an empty stomach. During drought, people went without food and therefore didn't take their medication. There were psychosocial issues like people's state of mind and relationship with the healthcare system. People also migrated away from the drought area and fell out of contact with their clinics and didn't establish contact with a healthcare provider in the new area they relocated to.

We also used a technique called interrupted time series analysis to look at adherence to treatment just before the drought period, during the drought, and after the drought. What we found was that adherence dropped during the drought. There was some recovery post-drought, but not complete recovery. The same was true of retention in care.

What else have you been working on recently?

The data we garnered from the SSRP project gave me and my research partners some credibility in the climate and health space, so we have used that study to inform applications for more projects. We have started a project, funded by the National Institute for Health and Care Research, on health system resilience in the context of extreme weather events in South Africa, Zambia and Mozambique. We have another project, funded by Wellcome, looking at the mental health impacts of extreme weather events in South Africa, Burkina Faso, Kenya and Mozambique. These are countries that suffer recurrent extreme weather events. These events have huge psychological effects when people lose loved ones, their livelihoods, and homes.

▶ A person with a handful of medication. Image credit: Adobe Stock.

‘The data we garnered from the SSRP project gave me and my research partners some credibility in the climate and health space.’

Professor Iwuji

POSITIVE FUTURES: FOSTERING SUSTAINABILITY RESEARCH THROUGH EQUITABLE PARTNERSHIPS

The complex challenges of our world can only be addressed through partnerships, and the 17th Sustainable Development Goal: Partnerships for the Goals – was designed as an underpinning goal to support the attainment of all the other goals.

We recognise that equitable partnerships lie at the heart of impactful sustainability research, particularly in international settings. Over the past seven years, SSRP fellows have worked alongside international partners to deliver the innovative projects covered in this report.

In February 2024, we hosted a workshop where we explored the concept, drawing on the experiences of our research fellows, and explored the definitions and main characteristics of equitable partnerships in the context of delivering sustainability research. Highlighting the requirements for setting them up and the barriers that many have overcome. The workshop featured Sussex Sustainability Research fellows and their global partners covering projects from Ecuador, Syria and South Africa.

Many definitions abound of equitable partnerships. However, the collective discussions showed that in a broad sense, in an equitable sustainability research partnership, the engagement goes beyond the research questions and supports civic engagement to the benefit of the communities where the research takes place, ensuring a balanced legacy beyond the research period. This is important given that the majority of the research undertaken as part of this programme takes place in low and middle-income countries.

The importance of place now comes to the fore. Whether working in conflict zones, in poor, under-resourced communities or inaccessible biodiverse forest regions, our researchers are aware of the need for flexibility and trust to counter any power imbalances that often affect international research partnerships. Many other challenges abound, including constraining funder guidelines, low risk appetite, adverse policies, limited infrastructure and geopolitics. Delivering high-impact, successful, and equitable research partnerships, therefore, requires a high level of intentionality at the research design stage.

Through our programme we have found that the following are key ingredients for success.

Strategic power sharing: Leadership of work packages in a funded research project could be split between investigators from both the Global South and Global North or, in other contexts, between the funded partner and the communities where they work. Decentralising power through distributed leadership.

Equitable allocation of intellectual property(IP): Ensuring equity in the allocation of IP rights to both Northern and Southern stakeholders. Recognising that benefits need to be shared for the partnership to be equitable. Commercial benefits arising from project IP should be distributed equitably among the key partners.

Collective authorship and data ownership: Clear agreement from the outset on data ownership and authorship of research papers or manuscripts. Ensuring that Southern-based investigators can also become first and senior authors on research papers.

Partnerships tend to have varying degrees of equity, and these lie on a sliding scale. Sustainability research partnerships typically strive for equity, inclusion and mutual respect, demonstrating this to varying degrees. As such, a more equitable partnership with an evenly balanced scale is more likely to be successful. By addressing power dynamics, enhancing transparency, and fostering genuine engagement, the research community can work towards more impactful and sustainable outcomes in the pursuit of the global sustainability goals. SSRP is looking ahead to continuing to demonstrate leadership in this area as we head to a positive future for people, nature and the planet.

Sephora Imomoh
Senior Programme Manager
Sussex Sustainability Research Programme

Sustainable Development Goals:

APPENDIX

SSRP Special Issue: Exploring Interactions among the Sustainable Development Goals: Case Studies from Three Continents

Link to the special issue of the journal on the topic exploring interactions among the sustainable development goals. Case studies from three continents.

Evidence for Action Symposium

Link to the event page for the SSRP high profile event: Evidence for Action.

SSRP homepage

Link to the SSRP homepage on the Sussex University website.

REF Case Studies

Link to the REF Impact Case study: Shining a light on the impact of pesticides on bees.

Link to the REF Impact Case study in the geography and environmental studies area.

Link to the REF Impact Case study on forecasting for drought in Kenya.

Link to the REF Impact Case Study on achieving sustainable trade post brexit.

Media Impact

Link to a media report in the telegraph.

Link to a YouTube video highlighting an SSRP fellow on the news.

Link to a guardian article on activist murders.

Link to a newsweek article on environmental defenders.

Link to a bbc article on Covid impacts on indigenous communities.

Link to the pressreader article in the metro.

Link to a dailymail news story on allotments.

Link to the times article on allotments.

Link to a guardian article on allotments.

Link to an ITV news article on species found along the Sussex Coast.

Link to a BBC article on endangered species found along the Sussex Coast.

Link to an independent news article on Sussex Scientists working along the Sussex Coast.

Link to a BBC news report on river pollution along the river Medway.

Link to BBC News article on the research by Sussex Scientists on the Andean Bears.

Link to a news item showcasing a real impact award winner.

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