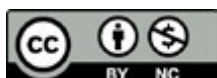


# UK-CGIAR CENTRE

Collaboration in Science  
and Innovation



# UK-CGIAR Centre



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## Introduction

**The UK-CGIAR Centre is helping to leverage the UK and CGIAR's world-class research infrastructure and scientific expertise to deliver evidence-based solutions and impact-driven research.**

The global food system both drives and is threatened by climate change and biodiversity loss. While there is a pressing need to improve the access of many people to affordable, safe and nutritious food, it must be done in a manner that mitigates climate change and avoids major environmental damage. Mobilising the resources and expertise needed to remedy an issue as multifaceted as food insecurity will require cooperation that traverses sectors, organisations, disciplines and geography. Strong international partnerships between scientific research centres, funders, sectors and non-governmental organisations have been recognised as essential to driving the innovation needed to put agriculture and the food sector on a sustainable path.

### Global food insecurity

- With 2030 just five years away, Sustainable Development Goal 2 – creating a world free of hunger – is dangerously off track.
- Across the world, around 733 million people experience hunger, and 2.83 billion people cannot afford healthy and nutritious diets.<sup>1</sup>
- Today's global agricultural productivity is around 20% lower than it could have been without the impacts of anthropogenic climate change.<sup>2</sup>
- The global food system is responsible for about one-third of greenhouse gas emissions and is the main driver of biodiversity loss.<sup>3</sup> To meet United Nations Framework Convention on Climate Change targets, agricultural production emissions need to decrease by around 39% by 2050 and land conversion needs to halt.<sup>4</sup>
- The world's human population is projected to rise to around 9.8 billion by 2050, meaning global food production may need to increase by as much as 70% to meet future consumption needs.<sup>5</sup>

Creating and developing dynamic and equitable international development partnerships is at the heart of the UK-CGIAR Centre's work. The UK-CGIAR Centre aims to support global food security by bringing together leading UK science institutes, CGIAR and local partner organisations to form impact-focused research collaborations. Officially launched in November 2023 at the Global Food Security Summit, the UK-CGIAR Centre is a strategic partnership between the Foreign, Commonwealth and Development Office (FCDO), the Biotechnology and Biological Sciences Research Council (BBSRC) (representing UK Research and Innovation), CABI and CGIAR.<sup>6</sup>

1. UNICEF. "The State of Food Security and Nutrition in the World 2024." (2024).

2. Ortiz-Bobea, A., Ault, T.R., Carrillo, C.M. *et al.* Anthropogenic climate change has slowed global agricultural productivity growth. *Nat. Clim. Chang.* 11, 306–312 (2021). <https://doi.org/10.1038/s41558-021-01000-1>

3. Crippa, M., Solazzo, E., Guizzardi, D. *et al.* Food systems are responsible for a third of global anthropogenic GHG emissions. *Nat Food* 2, 198–209 (2021). <https://doi.org/10.1038/s43016-021-00225-9>.

4. IPCC, "Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change," Cambridge University Press, Cambridge, UK (2021).

5. Hunter, M.C., Smith, R.G., Schipanski, M.E., Atwood, L.W., and Mortensen, D.A. "Agriculture in 2050: Recalibrating Targets for Sustainable Intensification", *BioScience*, Volume 67, Issue 4, April 2017, 386–391, <https://doi.org/10.1093/biosci/bix010>

6. Although it carries the CGIAR name, the UK-CGIAR Centre is not part of the CGIAR System Organisation. The UK-CGIAR Centre is not a CGIAR Research Centre, such as CIMYT or IFRPI, nor is it a Research Programme. CGIAR does not fund the Centre.

Goals of the UK-CGIAR Centre		
Strengthening relationships between the UK and CGIAR	Improving the local impact of research	Ensuring alignment with CGIAR Science Programmes

As a result of the UK-CGIAR Centre's work, scientists from leading UK research institutes and CGIAR are now working with local partners in regions that are high priorities for all parties.

This booklet provides an overview of the UK-CGIAR Centre, including details on its background, governance structure and approach to commissioning research projects. The booklet also outlines the work that has been undertaken so far by its commissioned projects and provides a brief overview of the Centre's future projects.

## The benefits of strengthening ties between UK science and CGIAR

The UK and CGIAR have a long history together. The UK government was one of the participating member states when CGIAR was established in 1971. Over the past 50 years, FCDO (and previously the Department for International Development) has been a major donor to CGIAR. Some UK research institutions have established good links with CGIAR centres and programmes, having collaborated with them on various initiatives and projects. Many of these project partnerships with CGIAR have allowed UK researchers to access, and work with, national agricultural institutions in low- and middle-income countries (LMICs). In some cases, the partnerships between CGIAR centres and UK scientists have yielded some important results when it comes to policy influence and development impact.

Overall, though, the relationships between CGIAR and UK science have been somewhat fragmented and in need of not only refinement but also scaling up through investment. A recent analysis found that no UK institutions feature in the top 30 external partners of CGIAR shown in the Dashboards and almost 50% of the active grants between CGIAR and UK partners amounted to less than £200,000, with 30% less than £100,000.<sup>7</sup>

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**CGIAR is the world's leading agricultural and food science and innovation organisation, with an unmatched track record of global impact going back 50 years. CGIAR delivers cutting-edge technology and evidence-based solutions to tackle major challenges in the food system, delivering outcomes for climate and nature, global health, and economic development. CGIAR research is carried out at 15 centres across the globe that collaborate with partners from national and regional research institutes, civil society organisations, academia, development organisations and the private sector. It has more than 9,000 staff working in 89 countries.**

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While the UK has an impressive history in agricultural and food science, the overall track record of translating foundational research into development impact is somewhat mixed. In cases where new research has been put into use in the form of technological tools, this has usually taken decades. The lack of focused objectives and clear roles and responsibilities of partners as well as the absence of more formal and sustainable funding structures have often been cited as major stumbling blocks to achieving impact.<sup>8</sup>

As a home to several world-leading scientific institutes, the UK is in a strong position to play a pivotal role in developing innovative solutions to the twin global challenges of food insecurity and climate change. Several governmental bodies and research councils in the UK have long recognised that there are significant opportunities to unlock the development impact potential of UK research institutions through greater collaboration with CGIAR. Funding the UK-CGIAR Centre enables FCDO to strengthen partnerships with other CGIAR funders to create the types of large-scale and long-term Research & Development programmes that the UK could not deliver on its own, helping to accelerate the process of translating research into impact.

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7. CGIAR Dashboard. <https://www.cgiar.org/food-security-impact/new-results-dashboard/>

8. Carter, A., (2018). "UK Agri-Tech Research: Opportunities for Collaboration with CGIAR Centres and Research Programmes", UK Collaborative on Development Research. United Kingdom.

## Governance of the UK-CGIAR Centre

The governance structure consists of:

- the Centre Board
- the Science & Impact Advisory Group (SIAG)
- the Centre Secretariat

### The UK-CGIAR Centre Board

The UK-CGIAR Centre Board is the senior decision-making body of the UK-CGIAR Centre, responsible for setting its strategic direction. The Board also has oversight and sign-off authority on activities of the Secretariat, such as deciding which projects to fund and authorising the grant letting, making decisions on commissioning, directing the Secretariat, and resolving any disputes. It comprises representatives of the four core members of the Centre: FCDO, CGIAR, BBSRC (representing UKRI) and CABI.

### The SIAG

The UK-CGIAR Centre recruited members of the SIAG to: make recommendations on appropriate, non-conflicted external subject matter expert proposal reviewers; review consolidated proposal feedback by independent reviewers; make recommendations to the Centre Board; and provide advice on the strategic direction of the Centre.

Members of the SIAG were selected based on their experience of UK research environments, international experience, and expertise in biophysical and social sciences.



**Nitya Rao**, Professor of Gender and Development at the University of East Anglia, Norwich, United Kingdom and Director of the Norwich Institute for Sustainable Development



**Jane Langdale**, Professor of Plant Development at the University of Oxford



**Eric Danquah**, Professor of Plant Molecular Genetics at the University of Ghana



**Wayne Powell**, Principal and Chief Executive of Scotland's Rural College

### The UK-CGIAR Centre Secretariat at CABI

The Secretariat manages the day-to-day operations of the UK-CGIAR Centre. This includes assisting with the commissioning process, financial management work and communications activities. The UK-CGIAR Centre Secretariat is hosted at CABI, an international, intergovernmental, not-for-profit organisation that improves people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. CABI has over 400 staff working in more than 20 locations across the world, which provides huge amounts of expertise in many fields. The organisation has over a century of experience in bringing stakeholders together, working on the ground to enable partnerships to have an impact at a local level. CABI has a longstanding relationship with FCDO. When looking for a host for the UK-CGIAR Centre, FCDO emphasised practical international development expertise, close connections with partners in country and an ability to ensure that agricultural research has an impact at local and national levels. CABI, then, was seen as the ideal home for the UK-CGIAR Centre Secretariat.



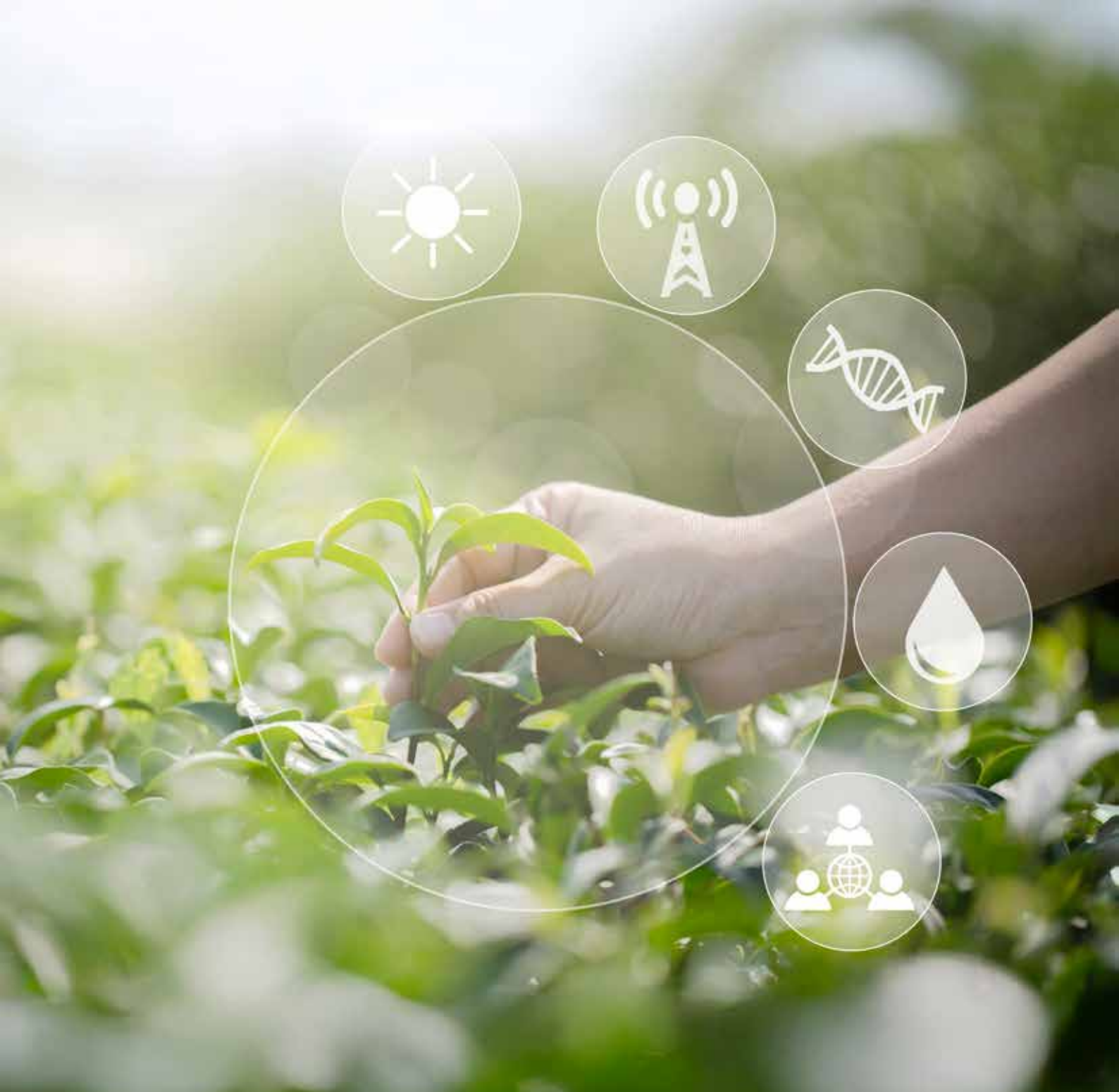
**In 2023, CABI hosted a delegation of top UK scientists and CGIAR representatives at its centre in Egham**

## **The UK-CGIAR Centre's approach to commissioning projects**

All UK-CGIAR Centre projects are commissioned through a closed competition process for invited applicants only and these are determined by a careful selection process involving the Centre Secretariat, funders, senior CGIAR representatives, independent reviewers and ultimately the Centre Board. The UK-CGIAR Centre does not accept unsolicited approaches for funding.

The Centre's commissioning model has been designed to:

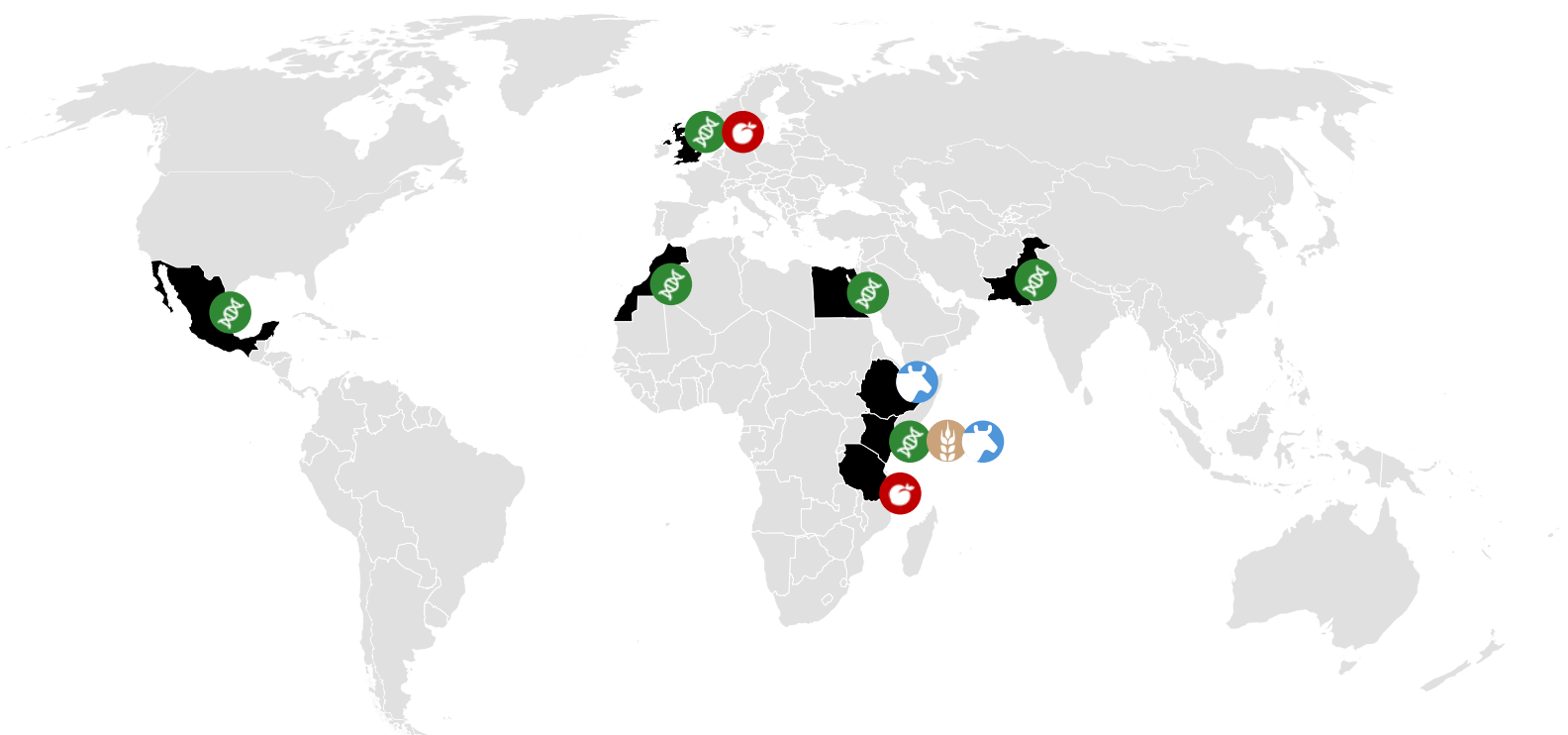
- ensure that UK institutes with a track record of publications in one of the Centre's research areas are identified and given equal consideration in the process
- ensure quality control of applications
- ensure that the feedback from the independent review panels to applicants is detailed
- limit the unnecessary transaction costs associated with open call processes
- limit the amount of administration required at the application phase and free up resources available for the delivery of the science itself



## The UK-CGIAR Centre research portfolio

The UK-CGIAR Centre takes a portfolio-based approach to its research projects. Some of the projects created by the Centre are based on preexisting relationships between partners, while others are new collaborations. So far, four research projects have been created around four research areas. Additional projects will be up and running soon. This section outlines the research areas and the projects working on them. It also offers a snapshot of the future UK-CGIAR Centre projects.

## Where the project teams are and will be working



Leveraging genetic innovations for accelerated breeding of climate



Innovation in sustainability, policy, adaptation and resilience in Kenya (iSPARK)



Defining new phenotypes for forage and crop by-products improvement based on rumen function and greenhouse gas emissions



Fruits and Vegetables for Sustainable Healthy Diets (FRESH) – Expanded Network with UK Partners (FRESH-EN UP)

**Research area: Crop genetic improvement  
for future climate resilience**



## Overview

Smallholder farmers in several LMICs contend with numerous climate-related challenges, including the growing threat of virulent crop pathogens such as wheat rust. Due to climate change, the geographical distribution of many plant pathogens is shifting, making rust epidemics more frequent and more severe in certain countries. These issues have contributed to low domestic agricultural productivity in several LMICs, causing them to become heavily dependent on imports of staple crops. Moreover, populations in many LMICs – especially women and children – experience nutritional problems like iron deficiency due to their diets. Enhancing food staples through crop breeding is seen as an effective pathway to not only raising resilience to climate change-triggered rust epidemics but also improving nutritional health and food security in LMICs. However, traditional crop breeding methods are slow in the context of current global crises and offer farmers few incentives to adopt them.



## Project: Leveraging genetic innovations for accelerated breeding of climate-resilient and nutritious crops

The research aims to accelerate the breeding process for staple crops and deliver higher genetic gain by harnessing genome editing and data-driven approaches. Project teams are working toward developing locally adapted, farmer-preferred wheat cultivars that exhibit greater resistance to wheat rusts and elevated levels of iron – an essential micronutrient for human health. Much of the work is taking place in Egypt, Kenya and Pakistan through local partners. Each of these countries depend heavily on imports of wheat and have created national plans for achieving self-sufficiency in wheat production. In the long term, the aim is that the research findings will contribute to:

- reducing reliance on imports in major wheat-importing countries
- improving resilience to climate change-triggered rust epidemics and reducing the levels of fungicide use
- increasing iron intake and improvement of women's and children's health in societies where wheat is a staple crop
- improving the understanding of gene editing technology across local stakeholders to facilitate the development of clear and practical gene editing policies
- improving ties between UK research institutions, CGIAR and the National Agricultural Research Systems (NARS).



**Project timeline: Jan 1, 2024–Nov 30, 2026**

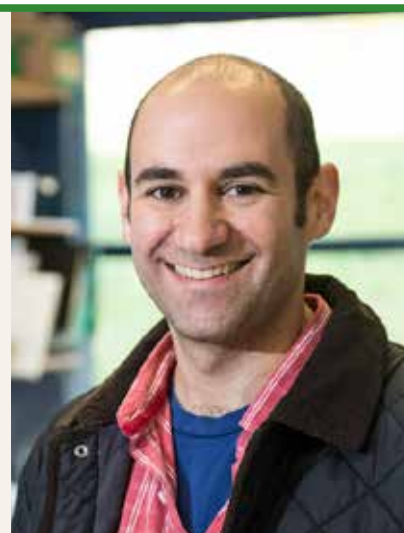
## The project partners

UK science institutes	CGIAR	NARS
John Innes Centre (JIC)	The International Center for Agricultural Research in the Dry Areas (ICARDA)	Kenya Agriculture and Livestock Research Organization (KALRO)
Norwich Institute for Sustainable Development (NISD)	The International Center for Maize and Wheat Improvement (CIMMYT)	Agricultural Research Centre (ARC), Egypt
		Quaid-I-Azam University, Pakistan
		Agricultural Genomics Institute at Shenzhen

The project is a culmination of extensive collaborations among various partners. Collectively, ICARDA and CIMMYT provide germplasm that accounts for over two-thirds of the world's wheat production. The project partners in Egypt, Kenya and Pakistan bring extensive experience and capabilities for conducting wheat field trials, including the use of modern glasshouses for pathology assays in KALRO-Njoro and ARC-Egypt. JIC possesses all the necessary facilities for transformation, molecular biology and plant growth, along with proven expertise in genome editing, field trials and genomic approaches. NISD bring the expertise in social science research needed to understand seed systems in target countries. This collaborative network ensures a comprehensive approach to addressing the challenges in wheat production and advancing the field of breeding.

*"The UK-CGIAR Centre is an especially welcome addition because it allows formal funding of collaborations between UK and CGIAR centres and enables a highly refined approach to establishing project partnerships. JIC has a long history of fruitful collaboration with CGIAR. But previous funding structures haven't worked too well in terms of bridging UK science and CGIAR. The creation of this collaborative project between JIC and ICARDA through the UK-CGIAR Centre has helped create clear objectives and clear plans, and the funding is a step towards allowing objectives to be achieved."*

**Professor Cristobal Uauy, JIC**



*"My hope is that this UK-CGIAR Centre project will not only foster future collaboration between UK research institutes and CGIAR but also help us to develop the exciting new crop breeding tools we are testing as part of the research. One of the many things I have really enjoyed so far about working on this project is how innovative new ideas are generated when the partners from the different centres meet and work together."*

**Dr Anna Backhaus, ICARDA**



*"The project is very important for KALRO. This is the first time we have screened gene edited materials on wheat in Kenya. The work being undertaken with partners offers great hope that we will soon be able to develop farmer-preferred varieties of wheat that have greater resistance to rust. This is potentially huge for wheat production in Kenya and elsewhere."*

**Dr Godwin Macharia, KALRO**





**Research area: Climate change adaptation and mitigation in agriculture**



## Overview

Environmental degradation and climate change threaten the sustainability and resilience of smallholder farming systems in LMICs such as Kenya. Both the drivers of and solutions to these problems are multiscale, encompassing both the local farm and policy levels. Smallholder farmers' resilience is hampered by socio-economic factors, while several hurdles limit the flow of information from science to policymaking, and ultimately to farmers, across national and subnational levels. The exponential growth in satellite data provides an opportunity for Kenyan agro-advisory services to access timely and accurate information to support informed decisions. Meanwhile, policymakers in Kenya's local and national government need solid evidence to scale up successful solutions and to devise policy and make investment decisions that contribute to environmental sustainability, climate resilience, and other Sustainable Development Goals.

However, few tools and metrics exist for devising precisely how, and evaluating exactly when, an innovation has successfully contributed to resilience and sustainability. As a result, there is a limited uptake of the agronomic and technological innovations that are designed to aid adaptation.



## Project: iSPARK (Innovation in Sustainability, Policy, Adaptation and Resilience in Kenya)

iSPARK aims to develop and implement a metrics-based approach to innovation in sustainability, resilience and adaptation that can provide tailored evidence for pathways and innovations across scales, both at agronomic field scale and regional policy level. The evidence and innovations coproduced with partners will be used to support the changes needed for sustainable, climate-resilient food security in Kenya. The project will help connect farm-level interventions with the national-level policies and investments that are needed to trigger systems transformation. The broader long-term goal is that the scientific progress made in Kenya as part of iSPARK will be translated to agroecosystems in other countries. iSPARK innovations are defined as one or more satellite or model metrics combined with one or more agronomic interventions into an agro-advisory product.



**Project timeline: Jan 1, 2024–Nov 30, 2026**

## The project partners

UK science institute	CGIAR	NARS
University of Leeds	Alliance of Bioversity International and CIAT (ABC)	KALRO
	International Institute of Tropical Agriculture (IITA)	iShamba

The University of Leeds has a long history of working with CGIAR, going back nearly two decades. Both the networks developed through those collaborations and the specific work on climate resilience give iSPARK an excellent starting point. For example, the University of Leeds and CGIAR worked on demonstrating the value of drought- and heat- tolerant crops as well as irrigation and land use change, and on the role of crop breeding, agro-technology and policy in supporting adaptation to climate change. iSPARK brings together partnerships and expertise from across a variety of initiatives in supporting the development of broader evidence bases around sustainable and climate-smart innovations for informing advisory services, investment and policy.

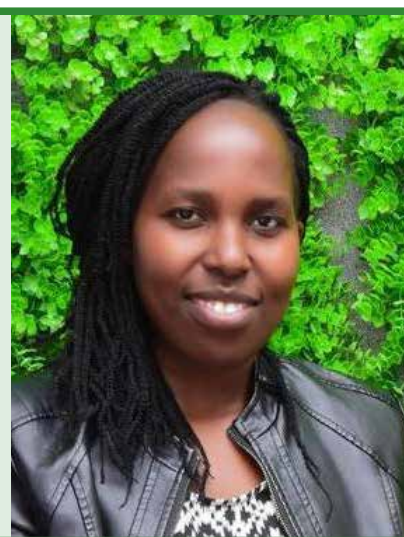
*“The timely creation of the new UK-CGIAR Centre is strengthening and widening longstanding collaborations between the University of Leeds and CGIAR. This holds huge potential to create cascading benefits to food systems in low- and middle-income countries, as well as food systems research in the UK.”*

**Professor Andrew Challinor, University of Leeds**



*“In the iSPARK project, iShamba plays a vital role in co-creating and simplifying complex scientific information, transforming it into bite-sized, actionable insights that smallholder farmers can easily understand and implement. Through our mobile platform, iShamba ensures timely access to relevant farming advice, empowering farmers to make informed decisions that enhance productivity, promote sustainability and improve livelihoods.”*

**Lilian Kirwa, Product Manager, iShamba**



In 2024, iSPARK convened a workshop at the ILRI Nairobi campus

A close-up photograph of a white cow's head, showing its eye, ear, and curved horns. The cow is looking slightly to the left. The background is blurred, showing other cows.

**Research area: Livestock improvement,  
animal health, nutrition and welfare**



## Overview

Livestock is a fast-growing, high-value agricultural subsector. In Africa and Asia, demand for livestock products is expected to grow 200% by 2030.<sup>9</sup> Smallholder farmers in many parts of these regions face a range of challenges such as animal diseases, lack of access to productive and adaptive animal breeds, and climate change. However, the biggest obstacle to improving productivity concerns how and what to feed livestock. Many smallholder farmers lack access to affordable, reliable, and acceptable (in terms of quantity and quality) feed for livestock. The livestock sector is also linked to greenhouse gas emissions. Ruminants like cows, sheep, and goats emit significant levels of methane as part of their digestion cycles. Released methane is also a great concern to livestock production as an estimated 2–12% of the dietary energy of livestock can be lost to methane production.<sup>10</sup> Consequently, there is a need to develop ways to increase the productivity of livestock systems, while also reducing their environmental impact through better feeding.



### **Project: Defining new phenotypes for forage and crop by-products improvement based on rumen function and greenhouse gas (GHG) emissions**

The research project aims to help farmers optimise animal nutrition through improved feeding, mainly crop by-products and forage which are the dominant feed resources, and to enhance livestock profitability by reducing feed costs relative to income. The teams will first create the knowledge needed to understand how plant breeding approaches can be harnessed to develop ruminant animal feeds that maximise productivity while minimising the environmental impact of livestock production.

Based on these findings, the project scientists will then develop feedstuffs that will allow animals to meet their genetic potential. In the long term, improving the efficiency of feed utilisation will mean smallholder farmers can keep fewer, more productive animals, thereby reducing greenhouse gas emissions.



**Project timeline: Jan 1, 2025–Dec 31, 2026**

## The project partners

UK science institute	CGIAR	NARS
Scotland's Rural College (SRUC)	International Livestock Research Institute (ILRI)	Ethiopian Institute of Agricultural Research (EIAR)

This commissioned project is a new partnership between SRUC and ILRI which brings together the respective organisations' expertise and experience. ILRI brings experience in ruminant nutrition and knowledge of genetic resources of forages and feed crops, particularly those relevant to sub-Saharan Africa. This compliments SRUC's expertise in rumen microbiology and their advanced high-throughput screening capabilities. The project intends to implement actions in Ethiopia through its partners in the EIAR to ensure that the benefits align with national strategies and priorities.

9. FAO, Livestock production, <https://www.fao.org/4/y4252e/y4252e07.htm>

10. K. A. Johnson, D. E. Johnson, Methane emissions from cattle, *Journal of Animal Science*, Volume 73, Issue 8, August 1995, Pages 2483–2492, <https://doi.org/10.2527/1995.7382483x>.

*"There have been several discussions in the past between scientists at ILRI and SRUC about creating a collaborative research project based on our complementary capabilities. But there was no mechanism to achieve it, so no concrete plans were put in place. It is excellent to finally see more formality between CGIAR and research centres in the UK."*

**Dr Chris Jones, ILRI**



*"The UK-CGIAR Centre has created the conditions to help SRUC and ILRI to focus on what we can achieve together now and going forward. Scientists at these two organisations are having the types of strategic conversations that might not have otherwise occurred had it not been for the creation of this project."*

**Professor Jamie Newbold, SRUC**





## Research area: Enhancing nutrition



© TreyzKapture for CABI

## Overview

Food systems are highly vulnerable to the impacts of climate change. The effects on yields and supply chains are not only making nutritious diets increasingly unaffordable and inaccessible but also exacerbating health disparities. The cost of nutrient-dense foods in several LMICs has increased significantly in recent years. Furthermore, reduced crop yields may limit the incomes of small-scale producers. There is a pressing need for robust evidence on effective strategies to increase fruit and vegetable consumption and improve nutrition among nutritionally vulnerable populations in LMICs in the context of climate change.



## Project: Fruits and Vegetables for Sustainable Healthy Diets (FRESH) – Expanded Network with UK Partners (FRESH-EN UP)

The goal of FRESH-EN UP is to strengthen evidence on effective strategies to increase consumption of fruit and vegetables in Tanzania, especially among women and adolescents. While Tanzania has achieved huge improvements in health and development over recent years, malnutrition remains a problem. Average consumption rates of nutrient-dense foods, including fruits and vegetables, are low in Tanzania. This project has the potential to inform efforts to improve diet quality and in turn improve health among nutritionally at-risk populations in the country.

The teams will work toward achieving the project goal by co-designing food environment and demand-generation interventions and coupling them with existing supply-side interventions, which will be tested in a pragmatic community-based randomised, controlled trial in the Arusha and Kilimanjaro districts of Tanzania. Additionally, the project will assess the suitability of food consumption data captured via existing national household consumption and expenditure surveys for creating a national-scale assessment framework to evaluate nutrition outcomes arising from prospective interventions to increase fruit and vegetable consumption in Tanzania.



**Project timeline: Jan 1, 2024–Mar 31, 2025**

## The project partners

UK science institute	CGIAR	NARS
London School of Hygiene and Tropical Medicine (LSHTM)	International Food Policy Research Institute (IFPRI)	Sokoine University of Agriculture (SUA)

FRESH-EN UP is a new partnership between LSHTM, IFPRI and SUA. The project will leverage each institution's expertise, bringing a unique set of skills, experiences and perspectives to the project.

This project is integrated with the CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets (FRESH).<sup>11</sup> FRESH-EN UP aims to add new research facets to the evaluation of FRESH's end-to-end approach to increasing fruit and vegetable intake, which combines analysis of dietary intake and consumption data, intervention co-design as well as partnership development and capacity sharing to inform scalable interventions to improve nutrition.

11. <https://www.cgiar.org/initiative/fruit-and-vegetables-for-sustainable-healthy-diets-fresh/>

*“Increasing fruit and vegetable consumption in Tanzania – a country with widespread micronutrient deficiencies and increasing prevalence of diet-related chronic disease – could deliver substantial health benefits. The challenge is understanding how this can be achieved and sustained in a way that is effective, feasible and equitable, despite economic pressures and climate change. The UK-CGIAR Centre provides a great opportunity to integrate UK research strengths into CGIAR programmes and initiatives, to deliver high-quality and impactful research that guides policies and interventions to enhance nutrition, in this case via increased fruit and vegetable consumption in Tanzania.”*

**Dr Edward Joy, London School of Hygiene and Tropical Medicine**



Throughout 2024, the FRESH-EN UP project held a series of workshops designed to strengthen collaboration between many stakeholders

# Upcoming projects

## **A Climate-Smart Agronomy Vision for Adapted Crops and Soils (AgVACS). Supporting smallholder farmer decision making through participatory experimental-modelling networks in West Africa**

Smallholdings represent around 80% of the world's farms and are concentrated in LMICs, supplying an estimated 50% of the world's food. Smallholder farmers typically experience low and variable yields and profitability due to climate variability, low resource use and efficiencies, and declining soil health. These problems are particularly acute across sub-Saharan Africa, where farmers are contending with increasingly frequent episodes of extreme drought, flooding, pest and disease infestations, and poor soil fertility.

This new UK-CGIAR Centre project will focus on climate adaptation preparedness in agricultural systems in the savanna regions of northern Ghana and Nigeria. For the project, the UK-CGIAR Centre has helped create a partnership between Rothamsted Research, IITA, Alliance of Bioversity International and CIAT (ABC), the Council for Scientific and Industrial Research–Savanna Agricultural Research Institute (CSIR–SARI) in Ghana, and Bayero University Kano (BUK) in Nigeria. The research will investigate the role of climate-smart cropping systems within scope of the Vision for Adapted Crops and Soils (commonly known as VACS), aligning with CGIAR's new Sustainable Farming Science Programme.



Bambara Groundnut ©Bio-innovation Zimbabwe

## **Genetic Improvement of Bambara Groundnut (*Vigna subterranea*) for Future Nutrition and Climate Resilience**

Indigenous to Africa, Bambara groundnut, *Vigna subterranea*, is a hardy heat- and drought-resilient nitrogen-fixing crop that can grow on poor soils while improving soil quality. In sub-Saharan Africa, it is the second-most widely cultivated legume food source after cowpea. Since smallholder farmers in the region produce the majority of groundnuts for both consumption and sale, their livelihoods depend heavily on the crop's yield. Often referred to as a 'complete food', Bambara groundnut is an excellent source of protein and fibre, as well as micro and macronutrients. Despite its agricultural and dietary benefits, the plant remains underutilised. There is a clear need for improved cultivars with greater yield stability, better adaptation and reduced cooking times.

This project aims to build on existing Bambara groundnut improvement programmes by advancing the genetic tools necessary to accelerate the release of improved varieties of the crop. This will help promote

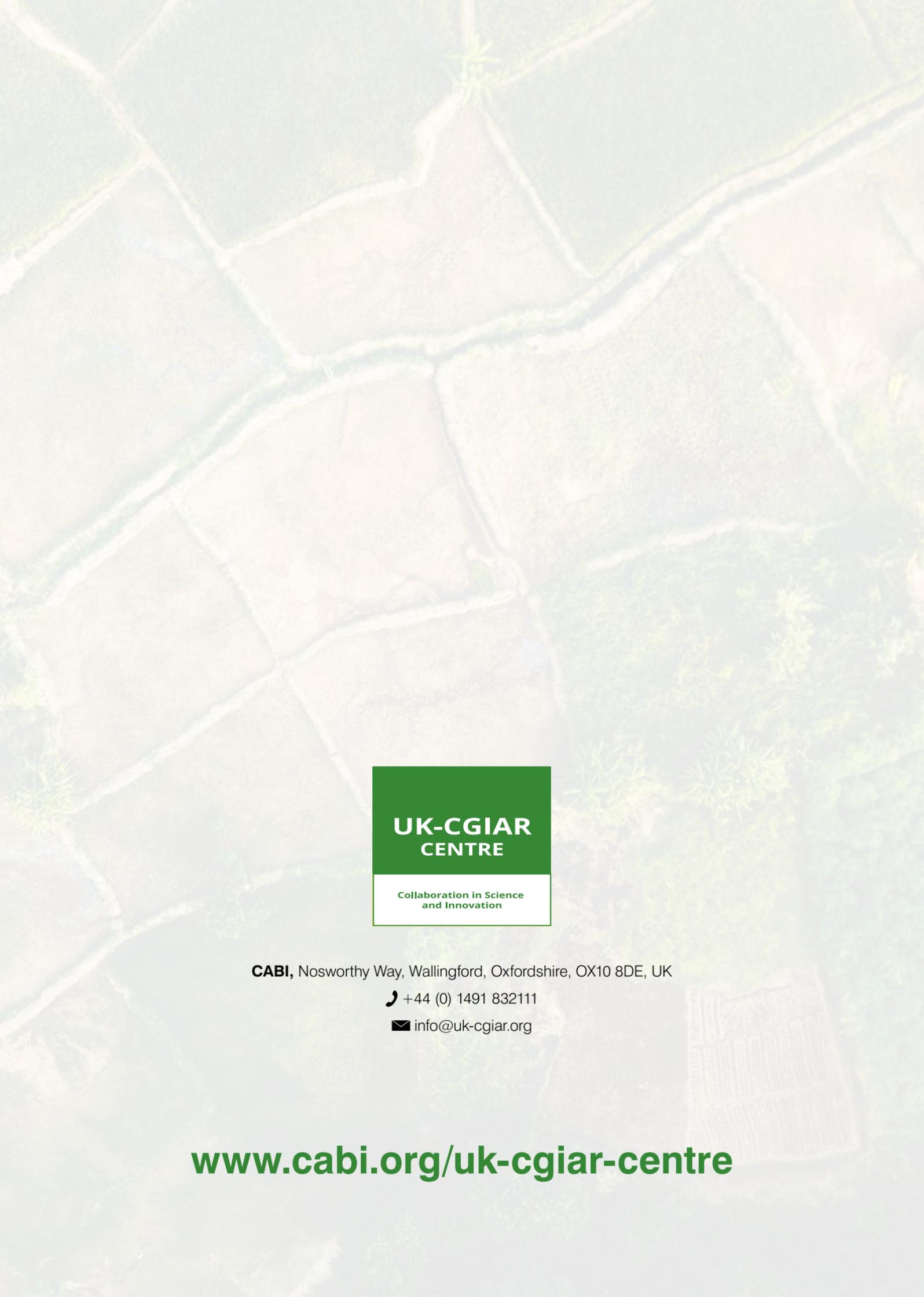
wider adoption of the crop. The University of Cambridge will be partnering with IITA and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for the project, with the University of KwaZulu-Natal, South Africa and CSIR-Crops Research Institute, Ghana, acting as the NARS. The other consortium organisations are Niab, the University of Nottingham and the Kirkhouse Trust.



Pigeon pea

## **Deciphering the root–soil interface to develop efficient N2 fixing, climate-smart pigeon pea cultivars with improved yield**

Pigeon pea (*Cajanus cajan*) is classed as one of the opportunity crops under the VACS initiative. As a major grain legume in several countries, its drought tolerance, nutritional qualities, and soil improvement potential make it a promising crop for sustainable agriculture in many climate-challenged regions. However, its production is vulnerable to rising temperatures. While the above-ground effects of heat stress on yields are being studied by CGIAR institutes, there is limited understanding of how pigeon pea's root system is affected by rising temperatures. This project will see the University of Nottingham teaming up with International Crops Research Institute for the Semi-Arid Tropics, CIMMYT and national partners from India (IIPR, Kanpur; UAS, Raichur & Dharwad; PJTSAU, Telangana), Kenya (KALRO), Malawi (DARS), Tanzania (TARI) and Mozambique (IIAM). The teams at these organisations will study how temperature affects root growth, rhizosphere signalling and their interplay in microbial recruitment, nodule formation, nitrogen fixation and overall plant performance.



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