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Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Theme 1 : Managing Natural Capital for the Future					
<p>A multidimensional assessment of insects for sustainable agri-food systems</p> <p>This research focuses on enhancing a multidimensional evaluation framework for insect species within sustainable agri-food systems. The background emphasises the global challenges posed by population growth, food demand, environmental impacts, and food waste. It highlights the potential of insects as a sustainable protein source aligned with Sustainable Development Goals (SDGs) and the transition to circular food systems. The aim of this study is to improve the existing framework and apply it to the National French Plan for the Use of Insects in Agriculture, contributing to the formulation of public policies. The methodology involves qualitative methods, collaboration with experts, and the use of statistical analysis tools to refine the framework and gather a comprehensive dataset. The research also underscores the potential for insects to address global challenges, SDGs, and ecosystem services. In summary, this research seeks to advance our understanding of insects' role in sustainable agri-food systems and contribute to evidence-based policy formulation.</p>	Colombia	Universidad Nacional de Colombia	France	Insect Biology Research Institute (IRBI), University of Tours (UT), National Center for Scientific Research (CNRS)	10
<p>Bridging current knowledge gaps to identify the metrics that best support sustainability in agroecosystems</p> <p>Bee and non-bee insect pollinators play an integral role in the quantity and quality of production for many food crops, yet there is growing evidence that nutritional, pests and other global change drivers are impacting pollinators in agricultural landscapes and reducing pollinator populations worldwide. As individual crop pollinators are embedded within community level processes, variation in community level plant-pollinator interactions may have large but poorly known consequences for crop pollinator performance. Many metrics exist to measure and monitor plant and animal biodiversity yet those that accurately reflect interactions and functions that support animal-mediated pollination service delivery. This will require the development of a more comprehensive framework to incorporate community and systems level processes into future planning and management to ensure the conservation of important ecosystem functions and services.</p>	Australia	University of New England	Germany	University of Freiburg	6

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<p>Ecosystem services and biodiversity conservation in cultural landscapes of temperate mountain regions</p> <p>Biodiversity is a key component of natural capital allowing sustainable ecosystem services. Despite the discrepancies between local demands and politics guidelines, there is a need to implement a “real” strategy for maintaining and enhancing biodiversity. The research focuses on a temperate region with a unique biodiversity, Iberian northwest mountains. The objectives are to know: i) status of biodiversity and ecosystem services in cultural landscapes; ii) existing threats; iii) local use of natural resources; iv) differences/similarities with other European temperate mountain areas. The aim is to show how biodiversity conservation and ecosystem services are embedded in cultural landscapes. The results will provide a basis for conservation of the landscape of temperate mountain areas, both for scientists and for land policymakers.</p>	Spain	University of Santiago de Compostela	Czechia	Faculty of Forestry and Wood Sciences, Czech University of Life Sciences Prague	20
<p>Engineering climate resilience in mussel aquaculture</p> <p>New Zealand and Chile both have significant mussel aquaculture industries that are facing significant challenges from coastal climate change. Potential solutions to these challenges will be addressed by bringing together expertise from Chile in ocean acidification and shell formation in shellfish, and from New Zealand in the utilization of mussel shell material for bioremediation. Through their research collaboration they will explore whether the hundreds of thousands of tonnes of natural mussel shell that is sent to landfill each year can be returned to the sea to restore areas of seabed, counteract ocean acidification, and help restore productivity of aquacultured mussel populations in both countries.</p>	New Zealand	University of Auckland	Chile	Centre of Research and Innovation for Climate Change, Universidad Santo Tomás	16

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<p>Managing the risk of soil phosphorus to the environment and food production</p> <p>One of the main drivers of poor water quality is algal growth driven by the loss of phosphorus from land. Phosphorus loss is enhanced by high concentrations of available soil phosphorus, especially when exceeding of crop requirements. The soils of Europe and Oceania contain some of the highest available phosphorus concentrations, globally. Lowering soil phosphorus concentrations is not simple, and reducing concentrations too low can risk food production. The fellowship aims at combining (and augmenting) databases of soil phosphorus and crop and livestock productivity to discover areas in Ireland and New Zealand (and Europe and Oceania) that are below, at or above thresholds for productivity. These data will guide local and national policy and fertiliser recommendations to optimise fertiliser phosphorus inputs for food production and good water quality and highlighting opportunities such as saving money by reducing fertiliser inputs.</p>	New Zealand	AgResearch New Zealand	Ireland	Teagasc	9
<p>Modelling complex socio-ecosystems for the conservation of marine ecosystem services: a transcontinental connection between Australia and Spain</p> <p>In light of global population growth, there is an urgent need to augment future food sources, including those from marine environments. However, provisioning ecosystem services such as fishery resources are in decline. Recognised international bodies such as the UN and FAO are advocating for enhanced marine resource management to revolutionise aquatic food systems, thereby ensuring food security, safeguarding the environment, and promoting social equity. A viable approach to tackle this challenge is the adoption of Ecosystem-Based Management (EBM), which comprehensively considers both environmental and social dimensions. In this way, conceptual modelling and Bayesian networks emerge as effective tools for gathering and analysing environmental and social data, working collaboratively with stakeholders. These tools and stakeholders co-working serve as ideal instruments for progressing towards EBM. In this fellowship, we will share methodologies and tools drawn from both Australian and Spanish research teams to inform governments about best management practices. This will facilitate an advance toward EBM, safeguarding marine ecosystem services into the future.</p>	Spain	Instituto Español de Oceanografía (IEO-CSIC)	Australia	Queensland University of Technology (QUT)	17

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<p>New ecological analysis and synthesis of the Guadalquivir LTER (1997-2023): lessons from NCEAS and US-LTER.</p> <p>As climate change is decreasing freshwater supplies globally, this proposal addresses the need of understanding the relationship between freshwater flowing through estuarine and coastal ecosystems and its fisheries productivity. At the Gulf of Cádiz, an area of special relevance for Spanish fisheries, we propose to study this relationship and the impact of droughts and floods on estuary biodiversity and its ecosystem functioning as a nursery area, to quantify the amount of freshwater needed to assure biodiversity conservation and economic benefits of coastal fisheries. To achieve this goal we have the best available long term dataset (26 years) for a temperate estuary, high quality fisheries landing data and the support and experience of NCEAS, a leader world institution for ecological analysis and synthesis. This useful scientific information will be transferred to the competent authorities to implement Fisheries Ecosystem Based Management.</p>	Spain	Andalusian Institute of Agricultural and Fisheries Research and Training (IFAPA)	USA	National Center for Ecological Analysis and Synthesis, University of California Santa Barbara	24
<p>Progressing access to healthy, sustainable and local fresh food for Quebec remote areas through public procurement. Lessons from France</p> <p>The aim of this research is to highlight the challenges and opportunities to progress the development of a proximity/localised sustainable agriculture for remote areas with a particular focus on the leverage role that public procurement of local, healthy food can play. This research will be conducted based on lessons from the French experience on public food procurement for schools and applying the foodshed methodology, and implemented in Quebec in a comparative perspective. In Quebec, there is a demand for increasing the access to healthy and sustainable local food, however there is a lack of a comprehensive vision of flows of local food systems namely characterisation of proximity agricultures oriented to local markets including food production capacity (production side) and the marketing channels for local food products including public procurement (consumption side). In addition, in remote areas, it is a huge challenge to preserve proximity agriculture in order to be able to ensure access to fresh, healthy and sustainable food and solutions already by current consumers and producers used may be an interesting source of learning. Furthermore, there is a rising awareness of the power of the public sector to enhance sustainable food consumption and production practices, and its social, economic, environmental, and health implications. This research will include a literature review, semi-structured interviews, spatial analysis and mapping and comparative organisation analysis.</p>	Spain	INRAE (French National Institute for Research on Agriculture, Food and the Environment), France	Canada	Laval University, Faculty of Agriculture and Food Sciences, Department of Agri-Food Economics and Consumer Sciences	18

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<p>The implementation of green chemistry applications to enhance the efficiency of food safety sample throughput.</p> <p>This research aims to integrate the environmentally-friendly technique of Supercritical Fluid Chromatography (SFC) into the food safety laboratory sample analysis at the International Atomic Energy Agency (IAEA). Additionally, it seeks to evaluate the potential of online Supercritical Fluid Extraction (SFE) to enhance the sample throughput of the analyses conducted to guarantee food safety in IAEA member states. The objective of this CRP fellowship research project is to establish a rapid and efficient methodology that is also environmentally harmless. The development of an effective, environmentally-friendly workflow is of crucial importance within the framework of the European Green Deal.</p>	Spain	EURL-FV, University of Almería	Italy	The University of Messina	13

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Theme 2: Managing Risks in a Connected World					
<p>Emerging Phytophthora diseases that threaten Irish crop and forest ecosystems</p> <p><i>Phytophthora infestans</i> was the pathogen responsible for the Irish potato famine. Emergence of new <i>Phytophthora</i> species has expanded due to agricultural activities and trade. International research that improves detection technology before plant disease pandemics occur are needed. We will deploy DNA based LAMP detection methods to detect <i>P. infestans</i> on potato and <i>P. ramorum</i> and <i>P. kernoviae</i> on rhododendron. Archival libraries, letters and herbaria at the Glasnevin Botanic Gardens will be examined for information on early disease outbreaks. I also will conduct museum talks, a <i>Phytophthora</i> diagnostic workshop for foresters, public lectures and work on a book called the "Potato plague" to connect this research with the public and the history of Ireland. I will also engage with policy makers concerned with emerging plant diseases in the EU.</p>	USA	North Carolina State University	Ireland	Department of Food, Agriculture and the Marine	26
<p>Reinforcing Climate Risk Management from Farmers' Behaviour and User-Driven Indicators (FRISBE)</p> <p>Farmers and irrigation district managers are in a favourable position to provide first-hand observations and a deeper understanding of the manifestation, relevance, and effects of climate change, as well as potential adaptation actions. The FRISBE proposal aims to reinforce risk assessment on climate change by delving into farmers' and managers' behaviour from a triple-loop approach (awareness, perceived impacts, and adaptive capacity), to then explore the usage of social-learning and user-driven indicators as inputs for behaviourally-based hydro-economic modelling to estimate the socio-economic consequences of adaptation actions—closing the reinforcing loop. Insights are collected from survey and semi-structured interviews to capture Californian farmers and irrigation districts managers' perspectives, risk preferences, uncertainties, and motivational patterns that influence their decisions when facing climate change. Data will be analysed to identify farmers' heterogeneity and managers' narratives, and results will be used as input for behaviour modelling as an approach to anticipate the anthropogenic sphere of the climate, agrohydrological and socioeconomic systems, and its potential outcomes.</p>	Spain	Politecnico di Milano, Italy	USA	University of California Los Angeles (UCLA)	22

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<p>Solving the root dilemma in saline soils: evaluating root responses under combined salinity stress and phosphorus deficiency</p> <p>Salinity is a worldwide problem that prevents the sustainable development of agriculture. In soils, salinity is inextricably linked with other stresses and understanding how roots respond to these often-contrasting environmental stimuli is more important than ever. By focusing on a phosphorus (P) deficiency and high salinity, key constraints to crop productivity in arid and semiarid regions, the proposed project will elucidating the links between P uptake, P use efficiency and other root functional traits in halophytes, leading to: the identification functional traits that improve soil foraging; the evaluation of trade-offs and opportunity costs; and the identification of new targets for improving salt tolerance and P use efficiency in crops. The interactions with stakeholders and international networks on saline agriculture will enable to gather critical knowledge on soil P management strategies and its sustainability in salt-affected farms.</p>	Italy	Università degli Studi di Firenze	Australia	The University of Western Australia	14
<p>The effect of dietary bioactives from sustainable food systems on gut microbiome diversity and metabolic profile</p> <p>Food represents the strongest tool for enhancing human health and environmental sustainability on Earth. Substantial scientific evidence links diets with human well-being and environmental sustainability. Opting for a diet abundant in plant-based foods and reducing the intake of animal-derived foods offers dual advantages: promoting better health and contributing positively to the environment. Achieving healthy diets by the year 2050 will necessitate significant changes in our eating habits. In addition, the composition and complexity of gut microbiota communities are crucial for the health of the human host. Diet is a key modulator of gut microbiota, providing vital substrates for their growth and function. Although there is emerging evidence to link our gut microbial communities and our unique metabolic response to foods, the extent of the changes in the gut microbial communities and the functional consequences of these changes in response to different diets need to be better understood. This proposal aims to examine the effects of a 2-week diet high in bioactive-rich foods from sustainable food systems on the microbial diversity of the gut compared to a low bioactive diet in healthy participants, to test the impact of consuming sustainable diets on health and to help in the urgently needed transformation of our global food system.</p>	Spain	Spanish National Research Council	United Kingdom	Quadram Institute Bioscience	9

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Theme 3: Transformational Technologies and Innovation					
<p>Bringing aquaculture into the circular bioeconomy: optimising production efficiencies in aquaponics</p> <p>Aquaponics is a sustainable food production system that combines aquaculture and hydroponics plant production in Controlled Environment Agriculture (CEA). While CEA systems are more intensive and efficient than traditional horticulture and aquaculture, they have a high level of technical and biological complexity that is best addressed by implementing precision farming techniques that are already being widely practiced in standalone hydroponics and aquaculture production systems. Interdisciplinary approaches i.e., knowledge and expertise from biology, engineering, crop science, aquaculture and related fields are required to address a variety of complex challenges to optimize aquaponics for economic and environmental sustainability.</p>	Sweden	University of Gothenburg	Australia	Curtin University	24
<p><u>Challenges and opportunities for privatised agricultural advice in the AKIS – a case study from the UK</u></p> <p>Agricultural education, training and advisory services have been identified as important drivers for change and innovation in agriculture, they contribute substantially to a well-functioning AKIS (Agricultural Knowledge and Innovation System). Advisory services in Europe are characterised by a growing pluralism of actors and their activities, with a particular increase in various private entrepreneurial actors. This trend towards privatised service provision comes with questions on their effectiveness and performance with respect to satisfying farmers' knowledge and innovation needs on the one side, and on the degree of responsiveness to societal and political objectives on the other. Additionally, advisors in general face a huge pressure to stay updated themselves with respect to innovative practices and the use of new, digital technologies. Due to characteristic sectoral features and recent political changes, the country England in the UK is particularly well suited to study how private entrepreneurial advisors cope with current challenges and manage to successfully perform within the larger AKIS. A qualitative case study will be undertaken, making use of semi-structured interviews and a visual AKIS diagnosis tool. Results will deepen analytical concepts for AKIS studies, inform policy makers about targeted measures to support knowledge and innovation spread and may increase advisors' intervention options within the AKIS and towards clients.</p>	Germany	University of Hohenheim	United Kingdom	Countryside and Community Research Institute (CCRI)	9

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<p>Evaluating the effectiveness of different bio-based sensors from food industry secondary streams in smart biodegradable packaging</p> <p>On the hierarchy of solutions to address food loss and waste, reducing food waste from the source is the most preferred. When food is wasted or lost further down the value chain, it constitutes even more economic losses, with graver impacts on the environment. As such, the use of packaging is not only a strategic choice to protect and conserve food nutritional and microbial quality but also to prevent loss and waste and its associated consequences. According to the United Nations, about 14% of food produced is lost between harvest and retail, while an estimated 17% of total global food production is wasted along the food value chain. With the exponential increase in global population, wastage of food could be the greatest challenge in our attempt to achieve food security and meet the United Nation's Sustainable Development Goals. Smart packaging can be a strategy in our tool box for reducing food loss and waste. The present study is proposing to identify potential bio-based indicators/sensors that can be derived from waste streams of select plant-based foods during processing. These indicators, which will include anthocyanins, betalains, naphthoquinone (shikonin), and curcumin, will be isolated and included in packaging film formulations or used as coat for biodegradable films. The biodegradable films will also be produced from biopolymers (e.g. collagen and blood plasma proteins) extracted from animal co-products. The efficacy and effectiveness of each bio-based indicator/sensor as a viable smart packaging material for fresh meat will be evaluated and compared. Ultimately, this study intends to identify bio-based indicator(s) best suited and effective to detect defects in meat quality and extend the shelf life of meat during retail storage.</p>	Canada	Agriculture and Agri-Food Canada, Government of Canada	Ireland	Teagasc Food Research Centre	16

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<p>Sustainable conversion potential of wet agri-food wastes to intermediate energy carriers and its influencing factors</p> <p>Hydrothermal carbonization (HTC) coupled with specific waste-to-energy techniques, such as pyrolysis and gasification, is a promising route for the upgrading of wet biomass residues. Yet, improving water, energy and waste management is essential for the development of more sustainable agricultural and food systems. Currently, there is no comprehensive framework to understand how feedstock properties and carbonization process conditions influence the product characteristics and hydrochar subsequent uses. Therefore, the aim of this collaborative research is to combine advanced statistical/machine learning (ML) and Life Cycle Assessment (LCA) methodologies to understand wet waste valorisation and assess the most sustainable approach for bioenergy production from undervalued agri-food waste. Considering actual data collected from literature studies investigating the HTC of different components of food and agricultural residues (e.g., animal manure, food wastes, etc.) at different reaction temperatures, times and process severities, mass and energy balances will be performed for different scenarios and used to evaluate the whole life cycle of various application routes for hydrochars via the integration of ML predictions into an LCA model. Results obtained from this work are expected to provide guidance on effective strategies to manage different farming residues, while improving renewable energy production in the agri-food sector in line with circular economy objectives.</p>	France	CNRS – ICARE (UPR 3021), Université d'Orléans	USA	University of South Carolina	8

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<p>Sustainable plant-based solutions for gel-type dairy alternative products</p> <p>This fellowship programme is designed to bring a transformative change in the field of plant-based food technology by pioneering a dual gel network system that closely mimics the functional properties of traditional dairy products, with an initial focus on cheese. Utilising advanced Large Amplitude Oscillatory Shear (LAOS) rheology as a characterisation tool, the project aims to overcome the limitations of conventional plant-based ingredients in forming firm and functional gels. This research aligns with key themes of sustainability and transformational technologies, as identified by the CRP, and has broader applications in developing a variety of gel-type plant-based foods, including yogurt and seafood alternatives. By leveraging sustainable plant-based ingredients, the project aims to make a significant contribution to global food security and the United Nations Sustainable Development Goals. The fellowship will establish a robust and mutually beneficial collaboration between the University of New South Wales (UNSW) and the Massachusetts Institute of Technology (MIT), focusing on food rheology and plant-based food innovation. This research has the potential to influence OECD assessments on food security and sustainability, thereby making a meaningful impact on global efforts towards sustainable development.</p>	China	UNSW Sydney, Australia	USA	Massachusetts Institute of Technology (MIT)	6
<p>The social ecological-resilience of mid-scale farming systems in mountain and hill country areas</p> <p>This study empirically illuminates the social-ecological resilience of mid-scale farming systems in mountain and hill country areas. In Europe, these act often somewhere between short and long supply chains and provide high quality, environmentally friendly and socially acceptable products. Whereas much attention in scientific debates is given to alternative food systems at a small-scale, little is given to these mid-scale farming systems. To address this gap, this research objective is to carve out aspects that contribute to the social-ecological resilience of mid-scale farming systems in less favoured, remote, mountain and hill country areas in New Zealand. In contrast to the European context, agricultural policy in New Zealand does not provide producer support, which makes it an interesting case for investigation and comparison.</p>	Germany	University of Innsbruck, Austria	New Zealand	University of Otago, Center for Sustainability	14