CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Theme 1 : Managing Natural Capital for the Future					
Advancing processes of local agroecological practices' inclusion in climate change global solutions: "4 per 1000" Initiative lessons for and from Scotland The aims of this CRP fellowship research project are: i) to advance knowledge on processes of implementation of the "4 per 1000" Initiative in Scotland through agroecological practices by exploring how the initiative may articulate diverse local practices in its ethos; and ii) contribute to the discussion about soils public policy development in Scotland and how the "4 per 1000" initiative could be integrated and achieved through agroecological practices. The research will help both "4 per 1000" Initiative and Scotland by exploring for each respectively how to integrate existing bottom-up practices to introduce more flexibility in governance structures and allow and support more such initiatives within their top-down perspective. It could potentially provide guidance to CRP member countries for better coordination between top-down and bottom-up processes in the implementation of national and international policies on soils. The fellow is a Mexican researcher based in the UK who hopes to pursue similar research in Mexico with the potential to develop an international comparative framework linking existing agroecological practices with national sustainable agriculture and soils policies in coordination with the "4 per 1000" Initiative.	Mexico	The James Hutton Institute, United Kingdom	France	"4 pour 1000" Initiative, The Alliance CIAT-Bioversity International	9
Belowground carbon allocation by rice plants: exploring the trade-off between soil carbon sequestration and methane emissions This proposal aims at developing an understanding on the trade-offs associated with rice cultivations for food production and their role in the carbon dynamics through contributions to carbon sequestration and methane release. Paddy soils represent essential resources for sustaining global food security through rice production. They however also represent major contributors to global GHG emissions though, at the same time, hold an important potential to sequester carbon (C). The balance between C source and sink functions of rice agro-ecosystems is not always clear due to the high variability induced by different agricultural practices and soil types used for rice cultivation. Moreover, soil processes driving the trade-off between methane emissions and C sequestration are still not fully understood, especially due to the complex interactions and feedbacks between plants, soils and	Italy	University of Torino	Australia	University of Sydney	26

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
microorganisms. This research project will shed light on the plant-soil-microbe interactions responsible for regulating the soil C cycle. Through the use of stable isotope tracing techniques, we will provide novel insights into the dynamics of photosynthesised C in the rice rhizosphere and the implications this C input may have on methane production and C sequestration in these redox-dynamic environments. Research outcomes will therefore integrate our understanding of the effects of agricultural practices on the environmental sustainability of rice cropping systems worldwide, and contribute scientific knowledge essential to quantify the C economy and inventories of cropping systems that are at the basis of governmental policies.					
Capturing the drivers of crop water footprints in Africa and its regional patterns. Looking backward to move forward The aim of this fellowship is to assess the sign and magnitude of a series of macroeconomic, climatic and structural input drivers on the agricultural crop water footprint in the African continent. Econometric panel data techniques will be used and spatial dependence across countries will be taken into account to obtain elasticities that allow projections about the future water footprint to be made. By introducing some degree of temporal variation to the water footprint metric, the projections will provide a valuable output to be matched with ex ante simulation model drivers to improve existing assessments of irrigated water usage in the face of anticipated increases caused by economic growth and population. The outcomes of the project have an enormous potential impact to obtain a better evaluation of WF. A deeper knowledge of the direction and magnitude of the impact of a series of drivers on crop WF can help to design adequate strategies in order to promote improved water-use efficiency and, therefore, to achieve a sustainable withdrawals and supply of freshwater in a context of increasing water scarcity and human water demands.	Spain	Agrifood Research and Technology Centre of Aragón (CITA)	Spain	Joint Research Centre (JRC) - European Commission	13

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Connecting hydraulics and growth dynamics in maize leaves to improve drought tolerance The aim of this research project at the host lab is to improve current basic understanding of how leaf hydraulics relate to leaf growth via an intensive measurement campaign that will provide data to improve models and finally identify potentially interesting breeding traits for drought stress scenarios. The research includes examining the link between leaf water status and leaf hydraulic traits. This information will then be used to improve an existing hydraulic leaf growth model to highlight the mechanisms behind the link between leaf hydraulics and leaf growth dynamics. The improved model will then help study the impact of virtual genotypic variations on leaf growth dynamics to identify the most influential traits that deserve attention for breeding drought tolerant crops. With ongoing climate change, crops are increasingly threatened by drought. To safeguard productivity, breeding drought-tolerant varieties is crucial, but challenging. Inadequate instrumentation for monitoring plant hydraulics has hampered progress, both in basic understanding and in applied phenotyping. During the fellowship, unprecedented data will be generated through experiments on maize under variable conditions, using recordings in a novel technology developed by the Host's lab along with leaf elongation.	Belgium	ILVO	USA	Cornell University	17
Environmental and nutritional sustainability of urban value chains : case studies in France and Switzerland **Systemic transformations of the agri-food system are necessary to improve its environmental and** nutritional sustainability. The objective of the present project is to work in a multidisciplinary way to define methods of system modeling and sustainability analysis specific to territorialized food chains and thus to analyze the role of territorial proximities in terms of environmental and nutritional performance. This work will complement ongoing research in France with fieldwork in Switzerland in collaboration with UNIL and ETH and will thus benefit from the expertise of researchers involved in different disciplines. It is expected that the project will benefit to the involved stakeholders and the results will diffuse to society. The purpose for the fellow applicant is also to acquire new research skills in industrial ecology applied to territorial food systems.	France	Agrosup Dijon	Switzerland	Institut de géographie et durabilité (IGD), UNIL	19

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Intermediate wheatgrass – developing a resilient perennial grain and forage crop for Sweden This proposal aims at developing an understanding on how to effectively transition to the use of perennial grain and forage systems to provide food and other ecosystem services like carbon sequestration, nutrient retention, and biodiversity habitat. Intermediate wheatgrass is the first perennial grain and forage crop in the world, the research for which was pioneered in Sweden and the USA, the host country and country of the fellow. However, if intermediate wheatgrass is to become a major crop in Sweden, farmers' issues need to be investigated, including harvesting, forage value, grain yield, and germplasm adaptation. Additionally, the motivations and barriers to expanding the cultivation of intermediate wheat from farmers, industry, consumers and policies must be explored. The current paradigm in agricultural crop production is based on monocultures of annual species which require replanting every year and large amounts of external inputs Unintended consequences of this paradigm are lack of resilience to extreme weather, soil erosion, nutrient and pesticide losses, water pollution, reduction in biodiversity, negative impacts on human health, and social and economic exclusion. Perennial crops can increase sustainability compared to annuals because their continuous soil cover and root systems can sequester carbon, reduce soil erosion and nutrient leaching, and minimise pesticide requirements while simultaneously increasing farmer incomes due to decreased annual inputs and costs. Strategic placement of sensitive lands into perennials will also help improve water quality by reducing erosion and nutrient runoff. The long-term benefits of adopting intermediate wheatgrass could therefore be very significant.	Italy	University of Wisconsin - Madison	Sweden	Swedish University of Agricultural Sciences (SLU)	25

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Investigating the humane killing of CRUStaceans through science-based INdicators (CRUSIN) This proposal aims at developing an understanding on how to kill crustaceans as food sources to meet future food needs in a humane way. The research will explore crustacean welfare at the time of killing. Animal welfare has become a public concern, but more scientific evidence is needed to influence policy with regards to crustaceans. The European Food Safety Authority (EFSA) recommend that animals be spared any avoidable pain, distress or suffering during killing; because crustacean brains lack specific areas linked to the experience of pain, it is generally assumed that crustaceans do not feel any. However, research suggests that there are 17 indicators of animal pain, and decapods fulfil 14 of these. The researchers involved in this fellowship will use a multimodal approach to explore humane killing of crustaceans by investigating electrical stun parameters, stun duration, behavioural responses, and identifying biomarkers that indicate unconsciousness before a second method is employed to ensure death. This novel approach will inform the humane killing of these economically important animals and provide new date to inform industry methods and government policy. **Manuscript**: Rotllant G. et al. (2023), "Methods to induce analgesia and anesthesia in crustaceans: A supportive decision tool", *Biology*, 12(3), 387; doi.org/10.3390/biology12030387	Spain	Institute of Marine Sciences (CSIC)	Sweden	University of Gothenburg	18
Modelling microbially-driven nitrogen and carbon dynamics in soil amended with nano-biochar This research proposal aims at mitigating water quality degradation and greenhouse gas emissions in agricultural areas by using innovative methodologies relying on agricultural waste nano-biochar. It is a cross-disciplinary collaboration work with expectation of many innovative research outcomes, significantly contributing to SDGs (UNESCO-2015) and IPCC (International Panel on Climate Change) goals, and building a strong partnership between France and Japan. The specific purposes of the project are (i) to determine the roles of microorganisms in nano-biochar amended soil by measuring microbial activities and fictional genes and (ii) to develop a numerical model of microbially-driven nitrogen and carbon dynamics. GHG emissions from soil are mainly controlled by microbial activities. Specific activities and functional genes of the microorganisms can be inputted to variables and parameters in systems of differential equations used for modelling.	Japan	Okayama University, School of Environmental and Life Science	France	Grenoble Alpes University, Institute of Geosciences & Environment	13

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
New advances in remote sensing driven forest phenotyping This aim of this fellowship is to develop advanced remote sensing technologies to assess the efficacy of breeding tree trials by examining the response of trees to short and long-term climate, through volume, crown and foliage characteristics. Increasingly heat-drought, frost, and occurrence and severity of pest and disease are causing significant forest health issues. As a result, adapting forests to climate change will mean planting more resilient trees, but we are limited in our ability to assess enough trees in field studies to find the resilient ones. Individual tree evaluation is essential for ranking and selecting the best genotypes to ensure maximising target growth and yield attributes. Once matings among parent trees are complete, offspring are produced for testing and confirmation of their growth potential. Climate warming and extremes however could erode the genetic gains made over decades. The technologies developed during this fellowship will be greatly improve the ability to conduct the necessary evaluations to ensure the most resilient trees are used for tree breeding programmes.	Canada	University of British Columbia	New Zealand	University of Canterbury	26
Opening plant variety protection to diverse plant reproductive material and drought tolerant varieties to counter climate change in the EU (*Confidential*) The goal of this research proposal is to design a viable integrated strategy to open plant variety protection in the EU (and in other countries under the International Union for the Protection of New Varieties of Plants (UPOV)) to drought tolerant (DT) traits and diverse plant reproductive material, in order to create a strong incentive for plant breeding against climate change. The potential of both complementary approaches to adapt agriculture to climate change is very relevant, but there is no specific guidance on the inclusion and assessment of DT traits under UPOV nor under the EU Plant Variety Rights systems, and diverse plant reproductive material cannot get variety protection. Given the common nature and roots of both obstacles, a single adaptation – coherent and compatible with the UPOV framework as well as with seed certification and variety registration systems – may help to solve both issues. This would help to increase incentives for plant breeding of DT varieties and of diverse reproductive material, which is all the more relevant considering that both tools (DT varieties and diverse reproductive material), are known to be important tools in the fight against climate change. This research will carry out the comparative analysis of the relevant national policies and statutes, the interpretation of the key legal and technical concepts, as well as selected expert interviews to better frame and to improve the design of the final regulatory proposal.	Spain	Agro-Environmental and Water Economics Institute	France	Community Plant Variety Office (EU decentralised agency)	26

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Fellowship results: Research stays at the Community Plant Variety Office (Angers, France), Humboldt-Universität zu Berlin (Germany), and the University of Oxford (United Kingdom) were carried out. The legal concept of "organic variety suitable for organic production" under Regulation (EU) 2018/848 was analysed, and its compatibility with the system of the International Union for the Protection of New Varieties of Plants (UPOV), was also assessed –*see* Vives-Vallés (2022) "Organic varieties under Regulation (EU) 2018/848: analysis […]". It was also possible to work on some proposals to improve the EU Plant Breeders' Rights system (and particularly the so-called "technical examination") that may be of interest to promote innovation, either in general or specifically aimed at adapting plant varieties, and consequently agriculture, to the challenges posed by climate change –*see* Vives-Vallés (2023). The interface between these issues and other intellectual property rights, such as geographical indications, or with technological developments such as the so-called New Genomic Techniques, are also being explored. In this respect, ongoing and prospective collaboration with the above-mentioned institutions is expected to be key. **Manuscripts**: 1. Vives Vallés J. A. (2023), "Proposals for the improvement of the technical examination under the EU Plant Breeders' Rights system", *EFB Bioeconomy Journal*, Vol. 3, 100046; doi.org/10.1016/j.bioeco.2023.100046 2. Vives Vallés J. A., N. Rampazzo and J. Kępiński (2022), "Intellectual property in agriculture, Plant breeders' rights and geographical indications: towards a comprehensive approach to intellectual property in agriculture", Ed. Thomson Reuters					

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Predicting and improving catch welfare in wild-capture fisheries This proposal aims at developing an understanding on how to improve fish survival by reducing the impact of fishing gear-interactions on dummy, silicone sensor-equipped fish. The project will be the first study to demonstrate the utility of a Bayesian Belief Network to predict survival potential of discarded fish and of the use of sensor fish to measure underwater performance and hydrodynamics of towed fishing gear operations. This novel approach will shed light on a process which so far has been approximated by measuring gear deployment duration as a proxy for impact. Sensor fish data will be able to specify which forces actually most significantly affect fish in the capture phase. This knowledge should then lead to the development of new mitigation measure to both improve selectivity and underwater performance of fishing gear (e.g. less drag and fuel consumption) and welfare of catches (including better quality and market prices). Output from this project will inform decision-making surrounding the evaluation of proposals and granting of exemptions to the EU Landing Obligation. **Manuscript**: Uhlmann S. et al. (2023), "Effects of catch composition on the fate of European plaice (Pleuronectes platessa) discarded from Belgian beam trawlers", *Fisheries Research*, Ed. Elsevier, Vol. 261, 106616; doi.org/10.1016/j.fishres.2023.106616	Germany	Vrije Universiteit Brussel (VUB)	Denmark	Technical University of Denmark (DTU-Aqua)	8

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Theme 2: Managing Risks in a Connected World					
Building a climate change resilience index: a tool instrument to prioritise policies in the agrifood sector This project will help to define the resilience of the agrifood sector in a climate change scenario through databased physical and socioeconomic indicators in different geographical areas. It aims to develop a resilience model and a risk matrix model of greenhouse gas releases, along with corresponding climate impact assessments. The Resilience Index allow the extent to which regions are preparing to meet the challenges of Climate Change to be assessed in light of the latest reports from international organisations such as FAO, WHO, and others, which warn of the need to double the amount of food produced, in the same surface, with less fertilizers, less water and without fossil fuels. Once the Resilience Index has been defined, the researchers hope to generate economic and environmental impact risk matrices at different scales from the results of the indicators, to be able to transfer the knowledge readily to decision makers.	Spain	University of Zaragoza	USA	Cornell University	18
Disturbance and resilience of *Quercus ilex* and *Quercus suber* in response to individual and combined water stress and *Phytophthora cinnamomi* infection The project plans to study the effects of water stress and infection on oak trees. This includes analysis of the effects of weather extremes on tree mortality and infection by the invasive pathogen *Phytophthora cinnamomi*. Forest trees are exposed to a myriad of single and combined environmental stresses with varying strength and duration throughout their lifetime. While much progress has been achieved in quantifying the impact of single stresses on tree populations, multiple interacting stress effects have not been adequately assessed. This project will assess the disturbance and resilience of holm oak and cork oak populations from five Mediterranean countries in response to individual and combined water stress and *Phytophthora cinnamomi* infection. It is expected that both stressors act synergistically in terms of tree mortality and the response of trees will change with the plant origin. The project will also test the stability of resilience in response to two different strains of the invasive pathogen *P. cinnamomi*. The researchers expected the work to become a scientific reference on resilience assessment in response to combined stress in trees, and will provide real data into the uncertainty in modelling. Moreover, the work will identify holm oak and cork oak genotypes tolerant to combined stress.	Spain	University of Extremadura	Italy	University of Sassari	13

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Evaluation and calibration of CERES-maize (DSSAT) for maize silage production in northern Spain: Seasonal analysis and modelling climate change impacts Maize (*Zea mays L.*) silage is of major importance for milk production in the North of Spain. Cycle length, sowing date and temperature regime will determine the harvest date. Because weather is unknown at sowing date, there is a need to develop decision support based on historical weather series to help farmers optimise silage production. Production optimisation occurs through a better matching of cultivar cycle length to sowing date to produce more and better silage at optimal harvest dates. The CERES-Maize crop model in the Decision Support System for Agrotechnology Transfer (DSSAT) software package will be used to establish decision support to help farmers identify the best cultivar and site combination. Cultivar parameters will be estimated from a prior 3-year field experiment involving three cycle lengths (FAO 200, 300 and 400) at four sites in Asturias (North of Spain). Seasonal analysis will be used to examine the year-to-year variation in crop productivity due to climate. The CERES-Maize model in combination with a stochastic weather generator (30+ years of weather) will be used to quantify the climate change impacts on maize silage growth and production. Decision support will be developed based on the analysis of simulation outputs.	Spain	University of Oviedo	USA	Institute of Food and Agricultural Sciences, University of Florida	6
Expanding genome editing-based approaches for durable resistance to destructive begomoviruses This proposal intends to develop resistance in tomato against the whitefly-transmitted tomato yellow leaf curl virus (begomovirus) via a multiplexed genome editing technique. This is a potential means to establish an effective pest-management method against this pathogen by generating a high level of virus resistance. Tomato is one of the most important vegetable crops in the world. One of the major constraints to tomato production is whitefly-transmitted begomovirus, Tomato yellow leaf curl virus (TYLCV). Management of TYLCV is challenging and expensive and it is necessary to develop eco-friendly, efficient and durable tactics for conferring broad-spectrum disease resistance. CRISPR-Cas9 based genome editing technique has shown great potential for reducing viral infection. However, it was recently shown that targeting single bases for editing has serious drawbacks – most notable being the generation of escape mutants that will lead to disease. To overcome this undesirable outcome, the researchers propose to use a novel, multiplexed approach that would simultaneously target multiple genes and genus-wide conserved regions in begomoviruses, to generate a high level of virus resistance while eliminating escape mutants. This approach has the potential to expand the existing applications	USA	Washington State University	Spain	CSIC	20

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
of genome editing technologies to confer broad-spectrum and durable disease resistance against TYLCV. Proposed research, if carried out, generates new information and tools that will expand the existing CRIPSR-based genome editing technologies. Outcomes will benefit tomato-breeding programmes aimed at developing resistance to TYCLV while minimising escape mutants formation.					
Prioritising sustainable food and repurposing food waste for human and planetary health This multi-disciplinary collaboration seeks to ignite game changing solutions through optimising circular food systems and utilizing plant-based materials for food and co-products. Through harnessing the Montpellier network of agri-food research (the location of the host laboratory) and leadership in Europe and the Mediterranean region, the project will illuminate targeted policy instruments that support sustainable diets and nutrition security. It will investigate policies and incentives for channelling food waste and plant-based by-products into co-products and foods for humans. By considering policies such as the EU Green Deal Farm to Fork Strategy, among other regional and national approaches, the researchers will explore the challenges and solutions in food production processes, valorising unavoidable wastes and channelling food value chains into circular economies.	Canada	Dalhousie University	France	CIHEAM-IAMM - Mediterranean Agronomic Institute of Montpellier	15
Understanding the ecology of Mediterranean *Hyalomma* ticks in new areas (ECOTICKS) The project aims to study the ecology of Mediterranean *Hyalomma* ticks in new areas. It intends to determine ecological characteristics of two *Hyalomma* species, *H .marginatum* and *H. lusitanicum*, two hazardous tick species spreading in Mediterranean areas of Europe (e.g. in Spain and Italy) and posing the risk of transmitting the Crimean Congo hemorrhagic fever virus and other pathogens. Today, this genus is attracting attention due to its northward spread to areas where it is not common and the risk of CCHF transmission is of great concern. In this proposal, the researchers intend to exchange the complementary experience of three tick teams to predict the chances of establishment of this genus in central and northern areas of Europe and Spain. The fellow and host will exchange their different but complementary experiences to understand ticks ecology and predict the risk of its establishment and transmission of pathogens in new areas. **Manuscript**: Valcárcel F. et al. (2023), "Emerging Hya*lomma lusitanicum*: From identification to vectorial role and integrated control", *Medical and Veterinary Entomology* 12660; doi.org/10.1111/mve.12660	Spain	INIA-CSIC	Italy	Istituto Zooprofilattico Sperimentale della Sicilia "A.Mirri"	12

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Theme 3: Transformational Technologies and Innovation					
A safe genome editing to develop sporeless mushrooms – for sustainable agriculture without genetic pollution The idea behind the applicant's research proposal is to limit the genetic contamination to the environment, a very important goal for agricultural species in general, with very important implications in the long run in, for instance, the acceptance of transgenic use in agriculture. Genetic pollution undermines the genetic diversity in a species, significantly reducing the abundance of genetic resources in nature and consequently the diversity of species. The issue of the extermination of endemic species on crossing with alien species originally introduced as pets is often discussed, but in reality, the large-scale production of single or limited (including alien and genetically modified) cultivars in agriculture results in the loss of genetic diversity in wild homogeneous or closely related species frequently across the world. Thus, to develop an environmentally friendly and sustainable society, we must undertake technological and policy measures without neglecting the impact of genetic pollution by agricultural activities. The overall goal of this project is to establish a safe molecular breeding method that prevents the flow of genes from crops to wild populations. By combining the knowledge and technology of the fellow's and host's institutes, a sporeless mushroom cultivar will be developed, as a pilot model, using a newly developed genome-editing protocol with no transgene sequences. Another goal of this project is to demonstrate the feasibility of genome editing that is safe for humans and ecosystems. The results will increase interest in different countries on the topic of regulations regarding sustainable agriculture, as well as genome-edited crops. **Manuscript:** Nakazawa, T., M. Kawauchi, Y. Otsuka, Y. Honda et al. (2024), "*Pleurotus ostreatus* as a model mushroom in genetics, cell biology, and material sciences", *Applied Microbioly and Biotechnology*, Vol. 108, 217; doi.org/10.1007/s00253-024-13034-4	Japan	Kyoto University	Spain	Public University of Navarre	26

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Assessment and improvement of carbon sequestration in greenhouse horticultural crops The main objective of this research project is to improve knowledge about the CO_2 sequestration capacity of greenhouse horticultural crops and to study the use of new low-cost technologies to increase photosynthesis. This aims, on the one hand, to increase crop productivity, improving the relationship between the production obtained and the need for resources used (soil, water and nutrients) and, on the other hand, to improve the capture of atmospheric CO2 by crops. Given that there is currently very little information available on the amount of CO_2 captured by greenhouse crops, it is also intended in the medium term (after the fellowship) to quantify the amount of CO_2 absorbed by greenhouses in Almeria (Spain) (the fellow's home country). To this end, the spatial distribution of the photosynthetic activity of tomato, pepper and cucumber crops (the three most important in Almeria) in naturally ventilated greenhouses will be modelled. The potential synergies, learnings and collaboration with the WUR (the host institute) experience could provide a strong foundation for the quantification of CO_2 sequestration of horticultural crops around the world, also based in the large network of stakeholders of the host university. The research proposal to evaluate and improve the capacity of horticultural greenhouses to sequester atmospheric CO_2 could contribute to inform policy makers in the development of policies relatives to greenhouse industry, promoting new technologies that can enhance it. **Manuscript**: 1. Molina-Aiz F.D.et al. (2023), "Experimental and numerical assessment of carbon sequestration in horticultural crops inside Mediterranean naturally ventilated greenhouses", *Acta Horticulturae,* 1377, pp. 117-126; doi: 10.17660/ActaHortic.2023.1377.14 2. Molina-Aiz F.D. et al. (2023), "Use of augmented natural ventilation and 'double roof' with photoconversion films to improve crop photosynthesis inside greenhouses", *Acta Horticulturae,* 1377, pp. 253-260; doi: 10.17660/ActaHortic.2023.1377.30	Spain	University of Almería	The Netherlands	Wageningen University and Research Centre	18
Estimating the drivers of household food waste: bridging econometrics and simulation modelling This research project focuses on food waste, one of the most relevant topics the food systems are currently facing in Europe and the world, which undoubtedly connects to the planetary boundaries debate and the UN's 2030 Agenda for Sustainable Development. The problem to solve is that the parameterisation of food waste estimates within simulation models is lacking. As a result, it is difficult to gauge with any degree of	Spain	Centro de Investigación y Tecnología Agro-alimentaria de Aragón	Spain	European Commission Joint Research Centre	13

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
certainty how structural changes and economic growth impact upon the household's propensity to waste food. The main objective is therefore to construct a panel data set of food waste rates in the EU27 and other regions around the world (subject to data availability) and compare the potential divergences between some other food waste estimate data sets/approaches available in the literature. An ex-post analysis will then be conducted by employing econometric techniques to ascertain the drivers of food, food waste and parameterise these drivers into an ex-ante computable general equilibrium simulation model, which will generate projections of future food waste within a status quo baseline.		(CITA)			
Exploring stakeholder collaboration in a transition towards a circular economy for food *(Confidential)* The research objective was to examine how Dutch food waste stakeholders deliberate, negotiate and coordinate new practices, initiatives and interventions. There is a lack of research on multi-stakeholder collaboration in the food supply chain to transitioning towards a circular economy for food, especially focusing on the alignment of stakeholder orientations through vertical and horizontal collaboration. In order to develop a thorough understanding of stakeholder collaboration for the circular economy of food, a qualitative approach was adopted, and semi-structured interviews were conducted. The impact of the project is anticipated to have theoretical and policy relevance. The findings advance stakeholder theory in horizontal and vertical coordination, currently not much is known about success factors and the process of coordination. Stakeholder collaboration success factors, especially from the view of supporting stakeholders, will inform several actors about how New Zealand can set up and support food waste initiatives.	New Zealand	University of Auckland	The Netherlands	Wageningen University	22
Investigation of a spectrometric tool for consumer and food standard agency use on site The aim of this research project is to make a step forward to the design of a bespoke spectrometric systems, for consumer and food standard agency use, considering different sensors and data processing requirements, to determine food composition and quality parameters on site. Food safety, fraud prevention and implementation of sustainable healthy diets are major challenges for all European governments. Development of tools for consumers and food standard agency use may help to achieve these challenges. Non-invasive technologies based on infrared through digital devices can determine food composition and quality, but they require specific calibrations, a minimal technical knowledge and are too expensive for consumers. The fellow and host will investigate the required characteristics of a sensor, and explore different spectral pre-processing and multivariate analysis methods as well as	Spain	IRTA	United Kingdom	University of Strathclyde	8

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
strategies and correction actions to remove the factors that affect on-site measuring, such as packaging and temperature variations.					
Potato tuber periderm onthogenesis: a cell resolution map of gene expression *(confidential)* Periderm is a covering tissue basic for land plants because during radial growth, it preserves the plant against biotic and abiotic stress. Part of this protection is achieved by suberin, a recalcitrant polymer that, as such, has been suggested to draw down CO_2 from atmosphere. The aim of this proposal is to study the transcriptome and DNA methylome during the periderm onthogenesis at single cell resolution. Although single cell methodology has been widely used in animals, it is just starting to be conducted in plants and it has been foreseen as a powerful technique to assist plant breeding. It is anticipated that this project will provide genes able to reduce CO_2 emission.	Spain	Universitat de Girona	USA	Salk Institute	26
Redesigning the functionality of hexaploid cereal grain (oats) using CRISPR/Cas technology Gene editing techniques such as CRISPR/Cas has been shown to be very efficient for introducing point mutations, precise replacement of nucleotides leading to amino acid changes, and even for gene replacement. The researchers involved in this fellowship have used CRISPR/Cas to remove wheat proteins that are toxic for coeliacs. In this project, the aim is to use CRISPR/Cas to redesign the protein composition of the oat kernel to make it more amenable for bread making. Achieving this goal involves surgically acting on the different protein fractions of the oat grain with CRISPR/Cas technology, providing a redistribution of the grain's proteins that makes it much more suitable for baking. Oats are cereal with superior nutritional properties than wheat, but they cannot be used in bread making because their proteins do not form a suitable protein network that gives the dough the elasticity and extensibility characteristic of baker's wheat. However, oats are a cereal that coeliacs, and those suffering from other gluten pathologies, can eat. Achieving this objective would make oats a baking cereal, a cereal with high added value, not only for the gluten-intolerant community but also for the general population.	Spain	Institute for Sustainable Agriculture (CSIC)	USA	Center for Precision Plant Genomics, University of Minnesota	25

OECD
BETTER POLICIES FOR BETTER LIVES

CO-OPERATIVE RESEARCH PROGRAMME FELLOWSHIPS AWARDED FOR 2022

(N.B.: for confidentiality reasons, no names of individuals are given in this list)

Proposed Studies	Research Fellow's Nationality	Home Institution	Destination Country	Host Laboratory	Duration of Fellowship (weeks)
Sustainable extraction of bioactive compounds from food by-products This research project proposes to use mathematical modelling to explore the economic feasibility of bioactive compound extraction from raw materials. Despite massive investments and research into different ways of extracting useable residues, the problem of the management and conversion of agricultural residues and food by-products (which contribute to sustainability) into high value-added products is still a hot topic. There is a lack of knowledge about the economic viability in terms of both mathematical modelling and related simulations, of both the different bioactive extraction processes and the evaluation of their economic suitability for potential industrial, large-scale production processes. The projects aims to develop a first mathematical model that will fill this gap. **Manuscript**: Bassani A., A. García-Roldán G. Spigno and P. Jauregi (2024), "Extraction of phenolic compounds from spent coffee ground using natural deep eutectic solvents: New modeling approach", Journal of Food Process Engineering, 47(3), e14584; doi.org/10.1111/jfpe.14584	Italy	Università Cattolica del Sacro Cuore of Piacenza	Spain	AZTI (Member of Basque Research and Technology Alliance)	17